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February 6, 2020

Arthur Burbank
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Forest Service Intermountain Region
4350 South Cliffs Drive
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Subject: Smoky Canyon Mine Remedial Investigation/Feasibility Study (RI/FS)
Pole Canyon ODA 2013 Non-Time-Critical Removal Action (NTCRA)
Draft Removal Action Report

Dear Art,

Please find enclosed one hard copy and one CD of the complete *Draft Pole Canyon Overburden Disposal Area 2013 Non-Time-Critical Removal Action Removal Action Report* (RA Report) for the Smoky Canyon Mine RI/FS. The report documents the cleanup activities undertaken at the Pole Canyon ODA and provides Simplot's certification that all removal action objectives outlined in the 2013 Forest Service Action Memorandum have been met.

Simplot is submitting the enclosed document in accordance with the 2013 Administrative Settlement Agreement and Order on Consent/Consent Order (ASAOC) for NTCRA. The RA Report fulfills the requirements of Section 9.6.4 of the ASAOC and Section 2.7 of the Statement of Work (SOW). The RA Report will be stamped and signed by the licensed Professional Engineer who supervised the work and preparation of the report after comments have been addressed and the report has been finalized.

This document also can be downloaded at the website:

(b) (6)
Username: (b) (6)
Password (case sensitive): (b) (6)

Please contact me if you have questions regarding this submittal.

Sincerely,

Jeffrey Hamilton
Environmental Engineer

cc:
Arthur Burbank – USFS (unbound copy), 410 East Hooper, Soda Springs, ID 83276
Sherri Stumbo – USFS, 4350 South Cliffs Dr., Pocatello, ID 83204
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DRAFT

Pole Canyon Overburden Disposal Area 2013 Non-Time-Critical Removal Action Removal Action Report

Smoky Canyon Mine

February 2020

Prepared for:

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Smoky Canyon Mine
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Prepared by:

FORMATION ENVIRONMENTAL

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LIST OF ACRONYMS

AC	acres
ASAOC	Administrative Settlement Agreement and Order on Consent
ASTM	American Society for Testing and Materials
BLM	Bureau of Land Management
BMP	Best Management Practice
CEMPP	Comprehensive Environmental Monitoring Program Plan
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CMP	corrugated metal pipe
cm/sec	centimeters per second
COC	Chemical of Concern
CQA	Construction Quality Assurance
CQC	Construction Quality Control
CY	cubic yards
DQO	Data Quality Objective
EA	each
ECO	Engineering Change Order
EDS	Energy Dissipation Structure
EE/CA	Engineering Evaluation/Cost Analysis
EMP	Effectiveness Monitoring Plan
ESD	Explanation of Significant Differences
GPS	Global Positioning System
HASP	Health and Safety Plan
IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
Ks	saturated hydraulic conductivity
lbs/ac	pounds per acre
LS	lump sum
MDL	Method Detection Limit
mg/kg	milligrams per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ND	Non-detect
NPK	nitrogen, phosphorus, and potassium

NTCRA	Non-Time-Critical Removal Action
ODA	Overburden Disposal Area
OM&M	Operations, Maintenance, and Monitoring
OSC	Forest Service On-Scene Coordinator
OSWER	Office of Solid Waste and Emergency Response
PEMR	Performance and Effectiveness Monitoring Report
PQL	Practical Quantitation Limit
PRDR	Premilinary Removal Design Report
PRSC	Post-Removal Site Control
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RA	Removal Action
RAWP	Removal Action Work Plan
RD	Removal Design
RDR	Removal Design Report
RD/RA	Removal Design/Removal Action
RDWPTM	Removal Design Work Plan Technical Memorandum
ROM	Run-of-Mine
RPM	Remedial Project Manager
Simplot	J.R. Simplot Company
SOW	Statement of Work
SOP	Standard Operating Procedure
Tribes	Shoshone-Bannock Tribes
TRM	Turf Reinforcement Mat
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

CERTIFICATION

The undersigned hereby certifies that construction of the soil and chert/limestone cover system on the Pole Canyon overburden disposal area, including installation of storm water run-on/runoff controls and revegetation, is complete and was performed in substantive compliance with the Forest Service Action Memorandum and final project plans and specifications presented in the approved Removal Design Report, Removal Action Implementation Work Plan and Addendum 1, and approved Engineering Change Orders. This certification does not include monitoring and maintenance procedures required to maintain a functioning cover system. No other representation, expressed or implied, and no warranty or guarantee is included or intended.

Under penalty of law, I certify that to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of the report, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Brian G. Hansen, PE
Idaho License Number 9074
Senior Geological Engineer
Formation Environmental LLC
[Date]

1.0 BACKGROUND

This Removal Action Report (RA Report) was prepared in accordance with the requirements set forth in 40 CFR Section 300.165 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) to document cleanup activities undertaken at the Pole Canyon Overburden Disposal Area (ODA) at the J.R. Simplot Company (Simplot) Smoky Canyon Mine (Mine). As outlined in the January 9, 2013 United States Department of Agriculture (USDA) Forest Service (Forest Service or USFS) Action Memorandum (USFS 2013), Alternative 3, which includes a Dinwoody/chert cover system, was selected as the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) removal action for the Pole Canyon ODA to address threats to public health or welfare or the environment.

The Dinwoody/chert cover was implemented as a Non-Time-Critical Removal Action (NTCRA) in accordance with the 2013 Administrative Settlement Agreement and Order on Consent/Consent Order (ASAOC), among the Forest Service, Idaho Department of Environmental Quality (IDEQ), Shoshone-Bannock Tribes (Tribes), and Simplot (USFS, IDEQ, and Tribes 2013). The Forest Service is the Lead Agency for the Smoky Canyon Mine under the 2013 ASAOC, with IDEQ, United States Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM), and Tribes designated as Support Agencies. The accompanying Statement of Work (SOW), dated August 9, 2013, provided the framework for conducting the Removal Design/Removal Action (RD/RA) activities for the 2013 NTCRA at the Pole Canyon ODA. Revisions to SOW Sections 2.5, 2.6, and 2.7, dated June 13, 2017, clarified the requirements for three deliverables: Effectiveness Monitoring Plan (EMP), Annual Performance and Effectiveness Monitoring Report (Annual PEMR), and RA Report. Oversight of Simplot's activities throughout the RD/RA at the Pole Canyon ODA is conducted by the Forest Service On-Scene Coordinator (OSC).

Section 9.0 of the SOW specifies project completion and closeout activities that are necessary for conducting inspections to verify completed work and prepare a Final RA Report. The OSC and Simplot performed the Final Construction Inspection on August 9, 2016 to verify that outstanding items identified during the Pre-Final Construction Inspection had been completed. The RA Report is one of the RD/RA deliverables that fulfills the requirements of Section IX, Subsection 9.6.4 of the ASAOC and Section 2.7 and Attachment 1 of the SOW. This RA Report provides Simplot's certification that all removal action objectives outlined in the Action Memorandum have been met.

As specified in Section 9.0 of the SOW, when the OSC determines, after Final Inspection and review of the Final RA Report, that all removal actions were fully performed in accordance with the ASAOC (with the exception of any continuing obligations including implementation of the Post-Removal Site Control Plan [PRSC] Plan and EMP and payment of Response Costs), the OSC will provide a Notice of Completion to the Respondent (Simplot) as provided in the ASAOC and the ASAOC will be terminated.

1.1 Site Description

The Smoky Canyon Phosphate Mine is located approximately 24 miles east of Soda Springs in Caribou County, Idaho (Figure 1-1). The Pole Canyon ODA is a cross-valley fill on the east side of the Mine in the Pole Canyon Creek valley. The ODA consists of run-of-mine (ROM) overburden (waste rock containing seleniferous shales) covering approximately 120 acres of lower Pole Canyon, including the original Pole Canyon Creek channel (Figure 1-2). Most of the ROM material in the Pole Canyon ODA originated from Panel A, which was mined from 1985 until 1990. A smaller amount of ROM material originated from Panel D and was placed on the west side of the ODA in 1997. Reclamation of portions of the Pole Canyon ODA took place in 1989 and 1990 and again in the late 1990s.

Two NTCRAs have been implemented at the Pole Canyon ODA. The first was the Pole Canyon water management NTCRA (2006 NTCRA). This NTCRA consists of a bypass pipeline, infiltration basin, and run-on control channel, as shown in Figure 1-2. It was implemented in accordance with the 2006 ASAOC (USFS, USEPA, and IDEQ 2006) and was completed in 2008. The second was the Pole Canyon Dinwoody/chert cover NTCRA (2013 NTCRA). This NTCRA consists of a Dinwoody/chert cover system and storm water run-on/runoff controls. It was implemented under a separate 2013 ASAOC (USFS, IDEQ, and Tribes 2013) and was completed in 2015. The 2013 NTCRA is the subject of this RA Report.

1.2 Removal Action Requirements

Removal action goals outlined in the Forest Service Action Memorandum (USFS 2013) are presented in Section 1.2.1. Operations, maintenance, and monitoring (OM&M) requirements specified in the ASAOC (USFS, IDEQ, and Tribes 2013) are described in Sections 1.2.2 and 1.2.3.

1.2.1 Removal Action Goals

Section III of the Forest Service Action Memorandum (USFS 2013) provided an analysis of the threats to public health or welfare or the environment associated with the Pole Canyon ODA. As documented in Section IV of the Forest Service Action Memorandum, "actual or threatened releases of hazardous substances from the Pole Canyon ODA, if not addressed by implementing the selected Removal Action, may present an imminent and substantial endangerment to public health, welfare, or the environment." Alternative 3, a cover of three feet of Dinwoody material over a minimum of two feet of chert/limestone, was the recommended alternative for the Pole Canyon ODA.

Figure 1-1: Location of the Smoky Canyon Mine and Pole Canyon

The removal action goals for the project, as stated in Section V of the Forest Service Action Memorandum, are as follows:

1. Reduce or eliminate the amount of water that infiltrates into the ODA due to direct precipitation.

2. Reduce or eliminate the potential for ecological risk due to ingestion of vegetation on the ODA.

3. Reduce or eliminate the potential for risk to human receptors due to ingestion of vegetation, and ingestion of and direct contact with ODA materials.

4. Eliminate the release of chemicals of concern (COCs) from the ODA through sediment transport.

Information which confirms that the ODA material is contained by the cover system, and that the removal action goals have therefore been met, is provided in Section 5.0 of this RA Report.

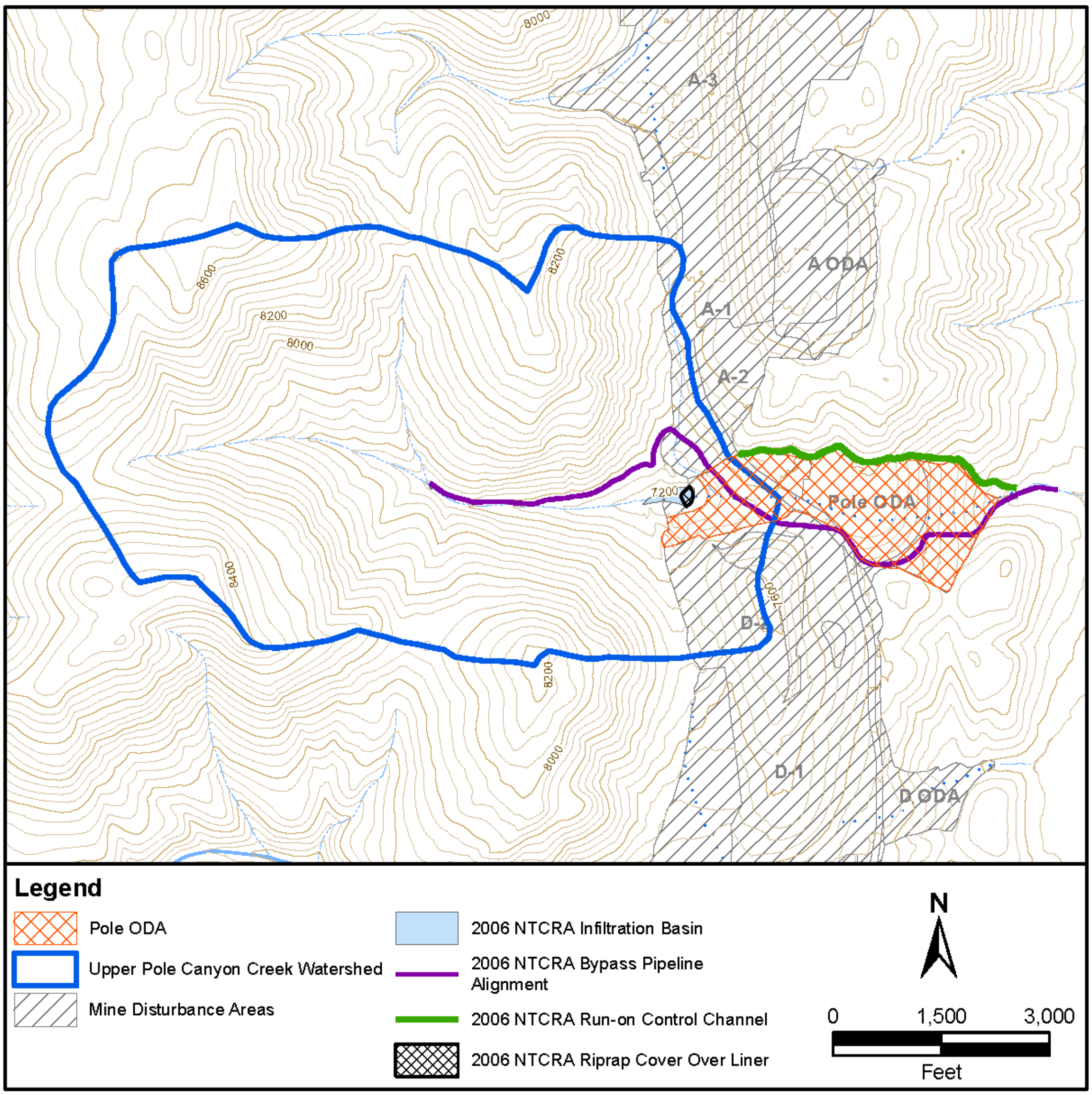

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Figure 1-2: Pole Canyon ODA 2006 NTCRA Components

1.2.2 Operations, Maintenance, and Monitoring Requirements

In accordance with Section IX, Subsection 9.6.5 of the ASAOC and Section 2.4 of the SOW, Simplot prepared a PRSC Plan for the 2013 NTCRA consistent with the NCP, 40 CFR Section 300.415(l) and United States Environmental Protection Agency (USEPA) Office of Solid Waste and Emergency Response (OSWER) Directive No. 9360.2-02. The Final PRSC Plan was submitted to the Forest Service on September 9, 2016 and includes long-term OM&M requirements and specific tasks to maintain the integrity and effectiveness of the 2013 NTCRA (Formation 2016b).

Simplot began inspections of the 2013 NTCRA at the Pole Canyon ODA in October 2016 after the PRSC Plan was approved. The plan requires semiannual inspections of the soil cover system; drainage ditches and channels; roads and fencing; sedimentation, infiltration, and detention basins; and the Dinwoody borrow area for the first three years and then annual inspections thereafter. Maintenance is performed during the summer, as needed. Inspection results and maintenance actions are reported annually in the PEMR. Additional information on long-term OM&M is provided in Sections 7.1 and 7.3 of this RA Report.

1.2.3 Effectiveness Monitoring Requirements

Effectiveness monitoring requirements are provided in the Pole Canyon NTCRA EMP. Initially, surface water and groundwater monitoring at the 2013 NTCRA were implemented under EMP Revision No. 4 (Formation 2016a), which addressed the 2006 NTCRA objective of reducing the rate of selenium transport from the Pole Canyon ODA to the environment thereby improving downstream and downgradient water quality. In accordance with Section IX, Subsection 9.6.8 of the ASAOC and Section 2.5 of the SOW, Simplot was required to prepare and submit an EMP consistent with 40 CFR Section 300.415(b)(4)(ii) and USEPA guidance for quality assurance (QA) plans (USEPA 2001, 2002) to evaluate the effectiveness of the 2013 NTCRA. EMP Revision No. 4 was updated in 2017 to address the objective of reducing or eliminating potential risks due to ingestion of vegetation on the ODA, and includes vegetation, surface water, and groundwater monitoring activities.

Simplot began monitoring under EMP Revision No. 5 (Formation 2018a) in May 2017. The EMP requires semiannual surface water and groundwater monitoring. Monitoring of selenium concentrations in vegetation growing on the cover system is required during late summer after vegetation is established. The need for subsequent vegetation sampling is dependent on the selenium concentrations in vegetation. An evaluation of the effectiveness of the cover system is reported annually in the PEMR as described in Section 7.4. Additional information on effectiveness monitoring is provided in Section 7.2.

1.3 Removal Design

The goals of the 2013 NTCRA were addressed by two Removal Design (RD) components summarized below and shown in Figure 1-3.

- ***Dinwoody/Chert Cover System*** – The Dinwoody/chert cover system consists of a three-foot layer of Dinwoody material with an estimated saturated hydraulic conductivity (Ks) of $1x10^{-4}$ centimeters per second (cm/sec) or less overlying a two-foot chert layer. The cover was revegetated with native low-selenium-accumulating grass species to control erosion and facilitate evapotranspiration. Gravel road base was placed over the soil cover in the blast compound and equipment storage area to provide an adequate driving surface in those areas.

- ***Storm Water Run-on/Runoff Controls*** – Run-on and runoff controls consist of ditches, channels, chutes, berms, swales, culverts, and associated energy dissipation structures (EDS) that capture and collect flows from adjacent, topographically higher areas and convey the flows around the Pole Canyon ODA. Captured runoff from the ODA is conveyed to one of several sedimentation basins. Water conveyance features were designed to carry flows resulting from a 100-year, 24-hour storm event. Water retention features were designed to retain volumes resulting from a 2-year, 24-hour storm event.

No significant regulatory or technical considerations or events occurred during preparation of the RD. The 2013 NTCRA was implemented at the Pole Canyon ODA in 2015. Construction of the cover system and storm water controls was completed in 2015, with minor follow-up construction performed in 2016. There were no Action Memorandum amendments, explanation of significant differences (ESDs), or technical impracticability waivers associated with implementation of the 2013 NTCRA.

1.4 Report Organization

This RA Report was prepared using USEPA guidance for Close Out Procedures for National Priorities List Sites (USEPA 2011) and summarizes 2013 NTCRA information pertaining to the required elements listed in Section 2.7 of the SOW. This report is organized as per USEPA's recommended remedial action report contents (Exhibit 2-5; USEPA 2011) and includes the following sections:

Section 1 Background

Section 2 Construction Activities

Section 3 Chronology of Events

Section 4 Performance Data and Construction Quality Control

Section 5	Removal Action Goals
Section 6	Final Inspections and Certification
Section 7	Operations, Maintenance, and Monitoring Activities
Section 8	Costs
Section 9	Contact Information
Section 10	References

Appendices that provide supplemental information to the RA Report as required in Sections 2.7.10 and 2.7.11 of the SOW include the following:

Appendix A	As-Built Construction Drawings
Appendix B	Photographic Log
Appendix C	2015 Weekly Construction Reports
Appendix D	Engineering Change Orders
Appendix E	2004-2019 Environmental Monitoring Data
Appendix F	Saturated Hydraulic Conductivity (Ks) Results
Appendix G	CQA/CQC Documentation
Appendix H	2015 Geotechnical Data

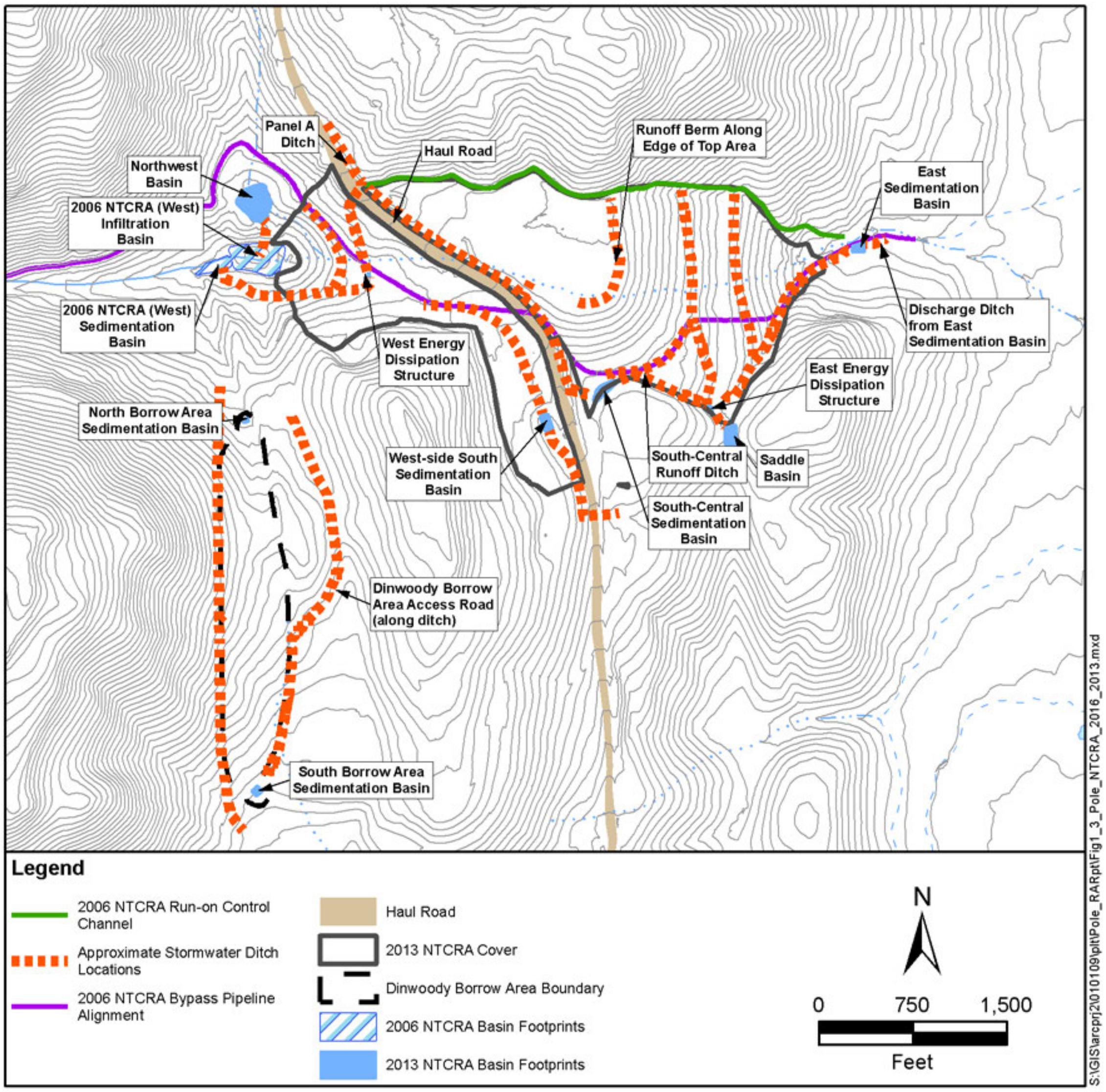

Figure 1-3: Pole Canyon ODA 2006 NTCRA and 2013 NTCRA Components

2.0 CONSTRUCTION ACTIVITIES

Simplot retained Kilroy, LLC ("Kilroy") of Afton, Wyoming, to implement the construction work, which began on March 16, 2015 and was completed on December 11, 2015, spanning a period of 38 weeks. Minor follow-up construction was performed in the summer of 2016. A general timeline of the main construction components is shown in Figure 2-1.

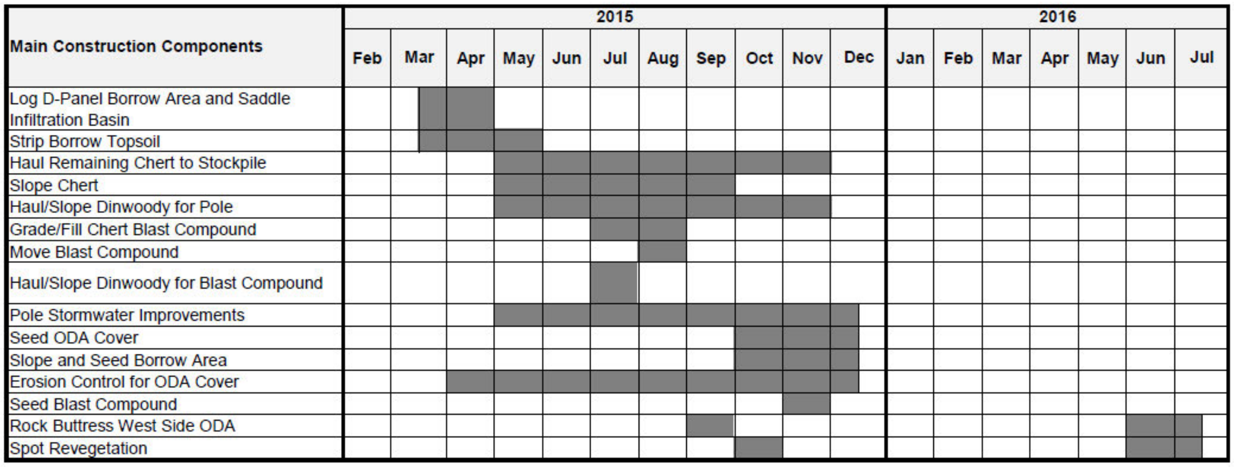

Figure 2-1: Schedule of Main Construction Components

Final as-built drawings are provided in Appendix A. A photographic log for the project is presented in Appendix B. Weekly construction reports for the 2015 construction season, prepared by Formation's Construction Quality Assurance (CQA) Manager (oversight engineer) on behalf of Simplot and submitted to the Forest Service, are provided in Appendix C. These reports contain detailed descriptions of the construction work and its progression as well as supplemental photographs. Engineering Change Orders (ECOs) are provided in Appendix D.

2.1 Construction Summary

The construction activities are discussed in detail in the following subsections.

2.1.1 Stockpiling Cover Material

Simplot stockpiled chert and Dinwoody material near the top of the Pole Canyon ODA in 2012 and 2013. Approximately 88,100 cubic yards (CY) of chert/limestone were stockpiled in the 27-acre area shown on Figure 2-2 and spread to a minimum two-foot layer before Dinwoody stockpiling began. Approximately 132,100 CY of Dinwoody material obtained from active mining at Panel F was also stockpiled in this area. The Dinwoody material stockpile was subsequently graded and therefore a cover system that met the thickness requirements of the 2013 NTCRA had already been installed on this area by 2014. An additional 22,300 CY of Dinwoody material from Panel F were stockpiled nearby. Approximately 187,800 CY of chert/limestone, generated from active mining were stockpiled in the adjacent areas shown on Figure 2-2.

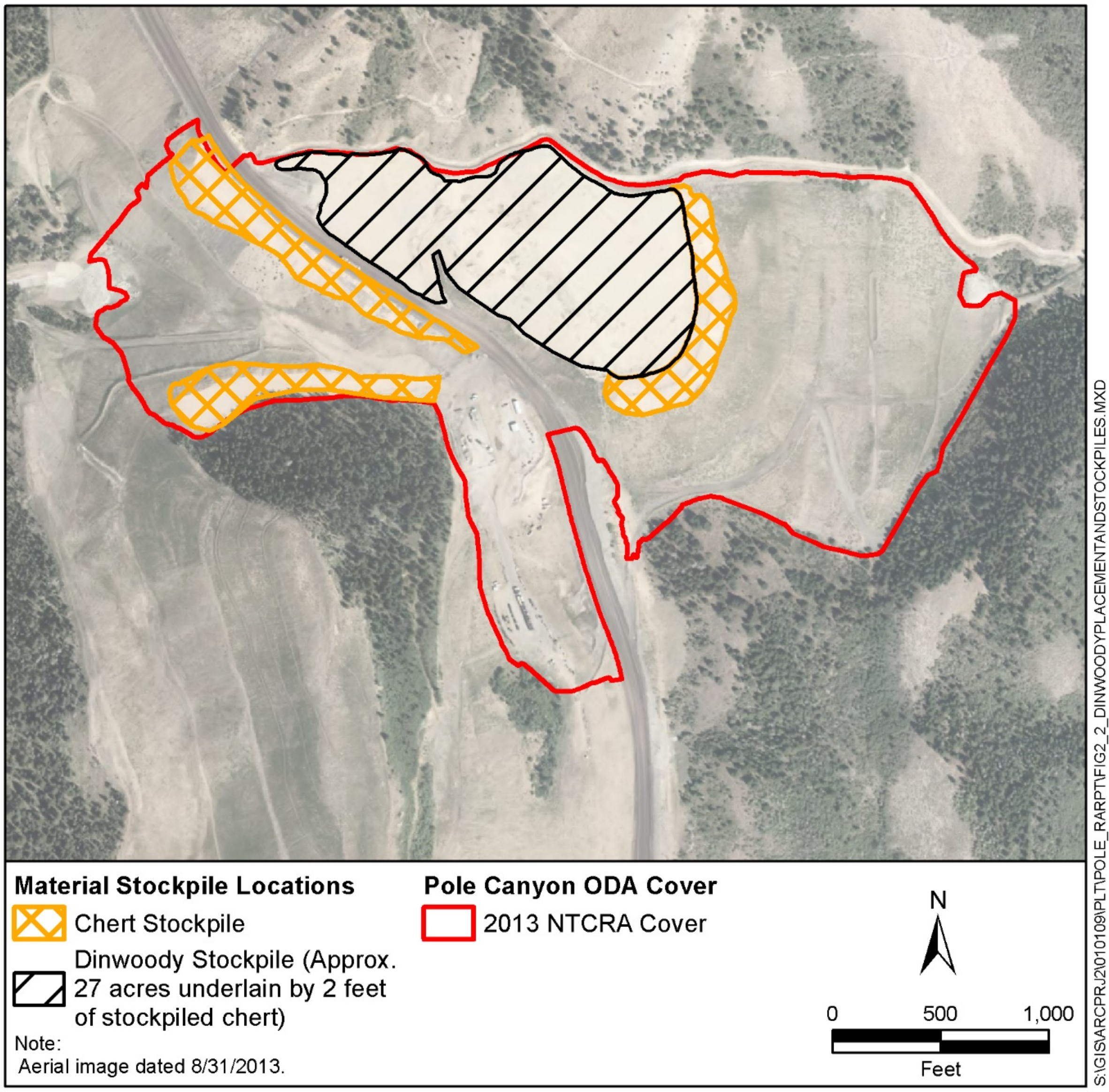

Figure 2-2: Location of Stockpiled Materials

2.1.2 Mobilization and Site Preparation

All of the equipment required for the Pole Canyon NTCRA construction was present on site and therefore mobilization efforts were minimal. Initial construction activities consisted of clearing snow, constructing temporary haul roads between the Pole Canyon ODA and Dinwoody borrow area, and developing the borrow area. Equipment and materials were staged on top of the ODA adjacent to the existing haul road. A temporary office trailer and temporary sanitation facilities were also installed near the top of the ODA and a staging area was established. Water was obtained from the existing water supply system at the Mine.

Site preparation activities included clearing and grubbing of the Dinwoody borrow area and construction and implementation of Best Management Practices (BMPs) for storm water and erosion control, dust control, and waste management. BMPs consisting of temporary run-on and runoff control ditches, sedimentation basins, anchored straw bales, straw wattles, silt fences, and hydromulch were used for storm water and erosion control. Dust suppression was performed as needed using water trucks and magnesium chloride on haul roads. Construction related wastes were staged and stored in the vicinity of the NTCRA area and at the Mine maintenance/office facilities. Petroleum products used for NTCRA construction were stored in accordance with current Mine operating procedures.

2.1.3 Regrading of ODA

As described above, stockpiled chert and Dinwoody material were spread and graded to the required thicknesses on the Pole Canyon ODA surface. A depression in the south-central portion of the cover area, where high infiltration was identified by a geophysical survey (Willowstick 2012), was filled with chert/limestone prior to placement of Dinwoody material. Some additional limited regrading of the ODA surface was required as part of the 2013 NTCRA construction activities to create a relatively uniform surface for cover construction.

2.1.4 Borrow Area Development

Additional Dinwoody material was needed for the 112 acres of the Pole Canyon ODA surface remaining to be covered. This material was obtained from an approximately 27-acre forested area just west and upslope of Panel D (Figure 1-3). The forested area was cleared and grubbed prior to development of the borrow area. Logging began on March 16, 2015 and continued through April. Silt fences and other BMPs were installed before clearing and grubbing began. Most of the timber cleared from the borrow area was sold. Some of the timber and slash was stockpiled along the eastern edge of the borrow area for later use in the reclamation. As much usable topsoil as possible was stripped and pushed into a berm along the perimeter of the borrow area and stockpiled for later use as cover soil. Straw bales and silt fence were placed around the soil stockpiles to limit erosion.

Following clearing and grubbing, suitable Dinwoody material was excavated down to the underlying calcareous shale and limestone and stockpiled on and adjacent to the ODA. The Dinwoody Quality Control Plan (Appendix E of Final Removal Design Report [RDR], Formation 2014a) was implemented to verify the suitability of the material. The borrow area was graded following removal of Dinwoody material to eliminate potential areas that could allow runoff to pool.

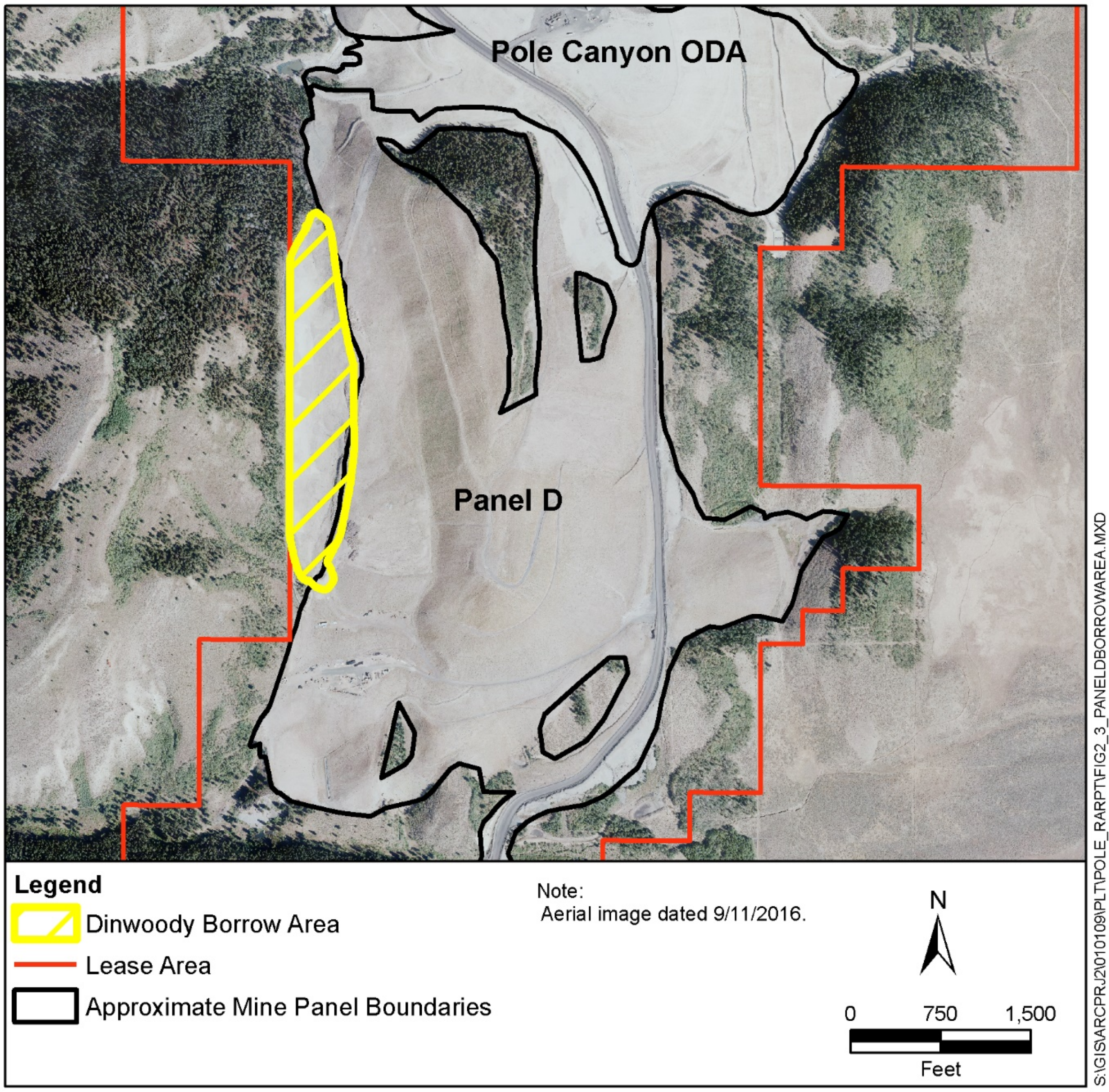

Figure 2-3: Dinwoody Borrow Area Location Adjacent to Panel D

2.1.5 Cover Placement and Construction of Storm Water Controls

The two-foot chert/limestone layer was placed in a single lift using global positioning system (GPS)-guided equipment. Existing stockpiles of chert/limestone were spread in adjacent areas. Additional chert/limestone from active mining was stockpiled for use throughout construction. The chert/limestone was staged in “rinds” (elongated stockpiles) near the east and west sides of the ODA and then spread in the downhill direction using dozers. The edges of the chert/limestone layer at the lateral extent of the cover were constructed at an approximate 2:1 slope.

Dinwoody material was placed in two lifts that, in total, resulted in a layer a minimum of three-feet thick. Existing stockpiled Dinwoody material was spread adjacent to the stockpiled locations. Additional Dinwoody material was obtained from the Dinwoody borrow area, as needed. Similar to the chert/limestone, the Dinwoody material was staged in “rinds” near the east and west sides of the top of the ODA and then spread in the downhill direction using dozers. The first one-foot lift of Dinwoody material was compacted using a rubber-tired compactor towed behind a bulldozer. This was done to increase the density and decrease the vertical hydraulic conductivity of the initial lift of Dinwoody material. The upper two feet of Dinwoody material were placed in a single lift and compacted only by equipment travel (haul trucks and dozers) during placement. The edges of the Dinwoody layers, at the lateral extent of the cover, were constructed at an approximate 3:1 slope. Test holes were excavated on a grid during cover placement to verify the required thicknesses.

Run-on and runoff controls consisting of ditches, channels, chutes, berms, swales, culverts and associated EDSs were constructed to control the release of contaminants from the Pole Canyon ODA via sediment transport. Trapezoidal ditches were designed to have bottom widths of 5 feet with 2:1 side slopes and depths varying from 2 to 2.5 feet. V-ditches were designed to have side slopes of 2:1 with depths varying from 2 to 3 feet. Half-round pipes installed for storm water control were 4 to 5 feet in diameter. Ditches, channels and chutes were lined with riprap, grouted riprap, or turf reinforcement mat (TRM) to limit erosion based on calculated flow velocities.

The storm water controls capture and collect flow from adjacent, topographically higher areas and convey the flows around the Pole Canyon ODA to one of several sedimentation basins (Figure 1-3). The lower east side of the ODA drains to the east sedimentation basin, the upper east side and top of the ODA drain to the south central sedimentation basin and saddle basin, the area south of the ODA drains to the west-side south sedimentation basin, and areas on the west and north sides of the ODA drain to the existing west infiltration basin. Construction of the various storm water control structures occurred concurrently with cover placement throughout construction to capture sediment mobilized from the NTCRA during precipitation events.

Construction work was deemed substantially complete at the close of the construction season in December 2015. A few remaining items were identified in the Pre-Final Inspection. Simplot and Kilroy completed these items in the summer of 2016.

2.1.6 Revegetation

Seeding and hydromulching of the cover were completed from October to December 2015. Fall seeding allows for seed germination and seedling growth to begin the following spring, when temperature and moisture conditions are favorable for the initiation of plant growth. The seed mixture included grasses identified in the surrounding undisturbed areas. Seeding and hydromulching occurred in two steps. The first step consisted of application of the seed mixture and fertilizer. The seed mix was drill-seeded and broadcasted on the soil surface at the rate of approximately 40 pounds per acre (lbs/ac). After seeding, the second step consisted of hydromulching the cover with tackifier to reduce erosion during initial vegetation establishment. Straw wattles and other BMPs were placed over the cover to further reduce the potential for erosion.

2.1.7 Reclamation

Access roads used solely for construction purposes, the Dinwoody borrow area, and other areas developed to support construction needs were restored to near pre-disturbance conditions. Reclamation included regrading, loosening of overly compacted areas by scarification, shaping, application of amendments and topsoil, and reseeding.

2.1.8 Demobilization

Following completion of construction, all equipment was removed from the site and cleanup of construction debris was performed. The site was left in a clean and tidy condition at the end of final demobilization.

2.1.9 Minor Follow-Up Construction

As mentioned in Section 2.1.5, a few minor follow-up construction items were identified in the Pre-Final Inspection that could not be addressed prior to the end of the 2015 construction season These items included 1) installation of rock buttresses along small, locally steep areas on the west side of the ODA cover to enhance long-term stability, and 2) grading a few minor areas on the top east side of the ODA to promote drainage and prevent ponding. Simplot and Kilroy completed these items in the summer of 2016. Additional spot revegetation was conducted in the summer of 2016. Surveying for the final as-built drawings was completed in October 2016.

2.2 Engineering Change Orders

In accordance with Section 8.0 of the SOW, design changes identified as necessary to the approved final design were documented with an ECO and submitted to the Forest Service for review prior to construction. Comments were provided and Simplot or their contractor addressed and incorporated the comments and submitted a final ECO to the Forest Service OSC for approval prior to implementing the changes. Three ECOs were prepared, submitted, and approved by the OSC, as summarized in Table 2-1. Copies of the ECOs are provided in Appendix D.

Table 2-1: Summary of Engineering Change Orders (ECOs)

ECO Number	Submittal Date	Engineering Change Order Title	Approval Date
1	2015-04-28	Dinwoody Borrow Sedimentation Basin Spillway Modification	2015-04-30
2 (Rev. 1)	2015-05-28	Seep Control Under Drains – South Central Sedimentation Basin Area	2015-05-27 [1]
3	2015-05-05	Runoff Control Channel East Toe Overburden Disposal Area	2015-05-20

Notes: 1 – ECO 2 approach approved via email from M. Kauffman; ECO subsequently revised and resubmitted.

ECO No. 1 was prepared to document the decision to use riprapped spillways for the Dinwoody borrow area sedimentation basins rather than half-round corrugated metal pipe (CMP), as indicated on the project plans. Other sedimentation basins in the 2013 NTCRA were designed to have half-round CMPs or alternative riprapped spillways, at the contractor's option. That option was inadvertently not included in the design of the Dinwoody borrow area sedimentation basins.

ECO No. 2 was prepared to document an approach for relieving potential hydraulic pressures in a regraded slope near the south-central sedimentation basin that, if left unaddressed, could reduce slope stability. Seeps were noted in this area during regrading early in the project. The seeps would be covered during subsequent project grading and filling. Therefore, an underdrain system was constructed consisting of trenches filled with drainage rock wrapped in geotextile. The under drains collected and carried seep waters out of the fill area, dissipating hydraulic pressures.

ECO No. 3 was prepared to document the need for, and design of, a small ditch on the lower east toe of the Pole Canyon ODA to divert clean runoff waters away from the east toe and into the south ditch. The purpose of the new ditch was to limit the amount of clean runoff water from the lower east face of the ODA that could mix with potentially selenium-bearing water issuing from the ODA toe.

2.3 Difficulties Encountered and Resolution of Deficiencies

As documented in the weekly reports (Appendix C), few difficulties were encountered during construction and few field decisions beyond those necessary for day-to-day construction management were necessary during the 2015 construction season. Design modifications were addressed through the ECO process as described in Section 2.2. Potential project issues that were encountered and resolved are summarized below.

- Weekly Report No. 22 (August 17-21), No. 23 (August 24-28), and No. 24 (August 31-September 4) document discrepancies between the topographic information used to design the project and those actually present in the field, and the decision to implement additional surveying to complete the project.

- Weekly Report No. 31 (October 19-24), No. 32 (October 26-31), No. 33 (November 2-7), and No. 34 (November 9-14) document the decision to increase from a five-day work week to a six-day work week to accelerate the construction schedule in order to complete as much work as possible prior to winter shut down.

- Weekly Report No. 35 (November 16-21) documents the decision to add three weeks to the construction schedule in order to substantially complete the project during the 2015 construction season and to also modify the access road alignment to the relocated blast compound on the Pole Canyon ODA top surface, along with related refinements to drainage works.

2.4 Removal and Disposal of Materials

A small amount of material was removed from the site. Construction related rubbish was staged and stored in the vicinity of the Pole Canyon NTCRA area or at the Mine maintenance/office facilities in accordance with Idaho Administrative Procedures Act (IDAPA) Solid Waste Management Rules. Simplot and their contractors handled and stored petroleum products for the NTCRA in accordance with current Mine operating procedures.

3.0 CHRONOLOGY OF EVENTS

Table 3-1 lists the major events and RD/RA deliverables for the 2013 NTCRA at the Pole Canyon ODA starting with approval and signature of the Forest Service Action Memorandum and ASAOC.

Table 3-1: Chronology of Pole Canyon ODA NTCRA Events and Deliverables

Removal Action Deliverable/Event	Date
2013	
Forest Service Action Memorandum Approved and Signed	2013-01-09
Statement of Work (SOW) (Appendix 1 of ASAOC for NTCRA)	2013-08-09
Draft Dinwoody Borrow Investigation Work Plan Submitted to USFS	2013-10-11
Administrative Settlement Agreement (ASAOC) for NTCRA Signed by USFS, IDEQ, Tribes and Simplot	2013-11-27
Final Dinwoody Borrow Investigation Work Plan Submitted to USFS	2013-12-27
Final Dinwoody Borrow Investigation Work Plan Approved	2013-12-30
2014	
Implementation of Final Dinwoody Borrow Investigation Work Plan	2014-01-28
Final Removal Design Work Plan Technical Memorandum (RDWPTM) Submitted to USFS	2014-02-18
Preliminary Removal Design Report (PRDR) (30% Design) Submitted to USFS	2014-02-27
Pre-Final Removal Design Report (RDR) (90% Design) Submitted to USFS	2014-06-13
Draft Removal Action Work Plan (RAWP) Submitted to USFS	2014-06-13
Final Removal Design Report (RDR) (90% Design) Submitted to USFS	2014-08-29
Final Removal Action Work Plan (RAWP) Submitted to USFS	2014-08-29
2015	
Construction Bid Packages Sent to Prospective Contractors	2015-01-26
Commenced Clearing and Grubbing Timber in Panel D Borrow Area	2015-01-29
Excavated Test Pits and Collected Soil Samples under Dinwoody Quality Control Plan	2015-03-03
Kilroy, LLC of Afton, WY Selected as NTCRA Construction Contractor	2015-03-15
Mobilization of Construction Equipment	2015-03-16
Commenced Construction Activities	2015-03-26
Engineering Change Order (ECO) #1 Dinwoody Borrow Sediment Basin Spillway Mod Approved	2015-04-30
ECO #2 Seep Control Under Drains – South Central Sedimentation Basin Area Submitted	2015-05-04
Jorgensen Associates, P.C. (Independent Surveyor) Began Providing Survey Control	2015-05-11
ECO #3 Run-Off Control Channel East Toe Overburden Disposal Area Approved	2015-05-20
ECO #2 (Rev 1) Seep Control Under Drains – South Central Sedimentation Basin Area Approved	2015-05-27
Pre-Final Inspection and Completion Items Punch List	2015-10-27
Construction Activities (Except Rock Buttresses on West Side ODA) Completed	2015-12-09

Removal Action Deliverable/Event	Date
Demobilization of Construction Equipment	2015-12-10
Pre-Final Construction Inspection Technical Memorandum (Updated Punch List)	2015-12-11
2016	
Forest Service Requests Schedule Extension for Final Inspection	2016-01-05
Draft Post-Removal Site Control Plan Submitted	2016-01-22
Permeameter Test Results for Cover Submitted	2016-01-26
Revised Draft Post-Removal Site Control Plan Submitted	2016-05-23
Residual Construction (Rock Buttresses and Spot Revegetation)	2016-06-01
Final Inspection with Forest Service and OM&M Items List	2016-08-09
Final Post-Removal Site Control Plan Submitted (without As-Built Drawings)	2016-09-09
2016 Fall Inspection of NTCRA Components under PRSC Plan	2016-10-18
Surveying for Final As-Built Drawings	2016-10-27
2016 Fall Effectiveness Monitoring under EMP	2016-11-07
2017	
Final As-Built Drawings Submitted	2017-01-30
Agency Comments on As-Built Drawings Received	2017-05-04
2017 Spring Effectiveness Monitoring under EMP	2017-05-15
Statement of Work (Appendix 1 of ASAOC) Sections 2.5-2.7 Revised	2017-06-13
Final Construction Inspection Report Submitted	2017-06-13
Revised Final As-Built Drawings Submitted	2017-06-13
2017 Spring Inspection of NTCRA Components under PRSC Plan	2017-06-15
2017 Fall Inspection of NTCRA Components under PRSC Plan	2017-09-12
2017 Fall Effectiveness Monitoring under EMP	2017-11-13
Final Post-Removal Site Control Plan and As-Built Drawings Approved	2017-11-21
2018	
2018 Spring Effectiveness Monitoring under EMP	2018-05-18
2018 Spring Inspection of NTCRA Components under PRSC Plan	2018-06-06
2018 Fall Effectiveness Monitoring under EMP	2018-10-22
2018 Fall Inspection of NTCRA Components under PRSC Plan	2018-11-06
2019	
2019 Spring Effectiveness Monitoring under EMP	2019-05-11
2019 Spring Inspection of NTCRA Components under PRSC Plan	2019-06-11
2019 Fall Effectiveness Monitoring under EMP	2019-11-04
2019 Fall Inspection of NTCRA Components under PRSC Plan	2019-11-14
Completed 3 years of Semiannual Inspections – Begin Annual Inspections in Spring 2020	2019-11-14

4.0 PERFORMANCE DATA AND CONSTRUCTION QUALITY CONTROL

Data were collected during and after construction of the Dinwoody/chert cover system to evaluate the effectiveness of the removal action and to document that the cover met the performance standards specified in the SOW for the 2013 NTCRA. Performance data and an assessment of the data quality are summarized in Section 4.1. Electronic data files that include monitoring data collected at Pole Canyon since 2004 are provided in Appendix E. A letter documenting achievement of the performance standard for the cover is provided in Appendix F. A description of the CQA and construction quality control (CQC) requirements is provided in Section 4.2. CQA/CQC documentation is included in Appendix G. Geotechnical data associated with CQA/CQC are provided in Appendix H.

4.1 Performance Data

Surface water, groundwater, and vegetation samples were collected as part of the effectiveness monitoring to document that the NTCRA is operational and functional. A brief description of the analytical results available is provided in Section 4.1.1. An assessment of the overall quality of the analytical data is provided in Section 4.1.2, along with a brief discussion of quality assurance and quality control (QA/QC) procedures followed, use of a quality assurance project plan (QAPP), and comparison of analytical data with Data Quality Objectives (DQOs). Section 4.1.3 summarizes data collected to confirm that the removal action met the performance standards for the cover as specified in the SOW.

4.1.1 Analytical Results

Effectiveness monitoring activities for the 2006 NTCRA at the Pole Canyon ODA began in 2007 under the Revised Draft EMP (NewFields 2007) and involved collection of surface water and groundwater samples at the monitoring locations specified in the plan. The EMP has been revised and monitoring locations have changed over time as outlined in EMP Revision Nos. 1 through 4 (NewFields 2008a; Formation 2011a, 2011c, 2016a). Effectiveness monitoring results for the 2006 NTCRA including data tables, cumulative flow hydrographs, and time-series plots are presented in the 2007 through 2016 Annual Effectiveness Monitoring and Performance Evaluation Reports (NewFields 2008b, 2009; Formation 2011b, 2012a, 2013a, 2013b, 2014d, 2015c, 2016c, 2017b).

Effectiveness monitoring activities for the 2013 NTCRA at the Pole Canyon ODA began in 2017 at the surface water and groundwater monitoring locations specified in EMP Revision No. 5 (Formation 2018a) following construction of the Dinwoody/chert cover system. Vegetation monitoring data were collected in July 2018. All collected data are presented in the Annual PEMR (Formation 2018b, 2019) to provide the Agencies with the performance evaluation results, effectiveness monitoring results, and the effectiveness evaluation for both the 2006 NTCRA and 2013 NTCRA in one combined annual report.

Surface water flow and surface water quality data were collected semiannually at station LP-1 (seepage from the downstream toe of the ODA), lower Pole Canyon Creek station LP-PD (downstream of the pipeline outlet), North Fork Sage Creek stations NSV-5 and NSV-6, and station LSV-1 (below confluence of Sage Creek but above the confluence of Hoopes Spring), as well as two key locations upstream of the ODA – at UP-PD (upstream of the pipeline inlet) and UP-IN (upstream of the infiltration basin). These data were collected to assess the combined effectiveness of the 2006 and 2013 NTCRAs in decreasing selenium transport from the Pole Canyon ODA to surface water. Surface water monitoring locations are shown on Figure 4-1. Data tables, cumulative flow hydrographs, and time-series plots for surface water collected to specifically evaluate the effectiveness of the 2013 NTCRA are presented in the 2017 PEMR and 2018 PEMR (Formation 2018b, 2019). Surface water flow and surface water quality data collected through 2019 are included as Appendix E.

Groundwater level and groundwater quality data were collected semiannually in three alluvial wells (GW-15, GW-22, and GW-26) and in one Wells Formation groundwater well (GW-16) at locations downgradient of the Pole Canyon ODA but upgradient of potential transport pathways from other source areas to assess the effectiveness of both the 2006 and 2013 NTCRAs in decreasing selenium transport from the ODA to groundwater. Groundwater monitoring locations are shown on Figure 4-1. Data tables, groundwater elevation hydrographs, and time-series plots for alluvial and Wells Formation groundwater collected to specifically evaluate the effectiveness of the 2013 NTCRA are presented in the 2017 PEMR and 2018 PEMR (Formation 2018b, 2019). Groundwater elevation and groundwater quality data collected through 2019 are included as Appendix E.

Vegetation community monitoring data and vegetation tissue samples were collected at six locations (Zones 1 through 6) on the Pole Canyon ODA Dinwoody/chert cover system in summer 2018 to assess vegetation cover conditions and evaluate selenium concentrations in vegetation growing on the cover. Vegetation monitoring Zones 1 through 6, vegetation monitoring transects, and vegetation monitoring plots for tissue sample collection are shown on Figure 4-2. The timing of this monitoring was approximately 3 years after the cover was seeded, which allowed time for the vegetation to become established. Selenium concentrations in forage vegetation, a description of the grassland community, and percentages of vegetation/ground cover estimates are presented in the 2018 PEMR (Formation 2019).

As required in Section 2.7.10 of the SOW, electronic data files of the surface water, groundwater, and vegetation effectiveness monitoring data collected under the ASAOC for the 2013 NTCRA and described above, as well as monitoring data collected at Pole Canyon since 2004, are included as Appendix E.

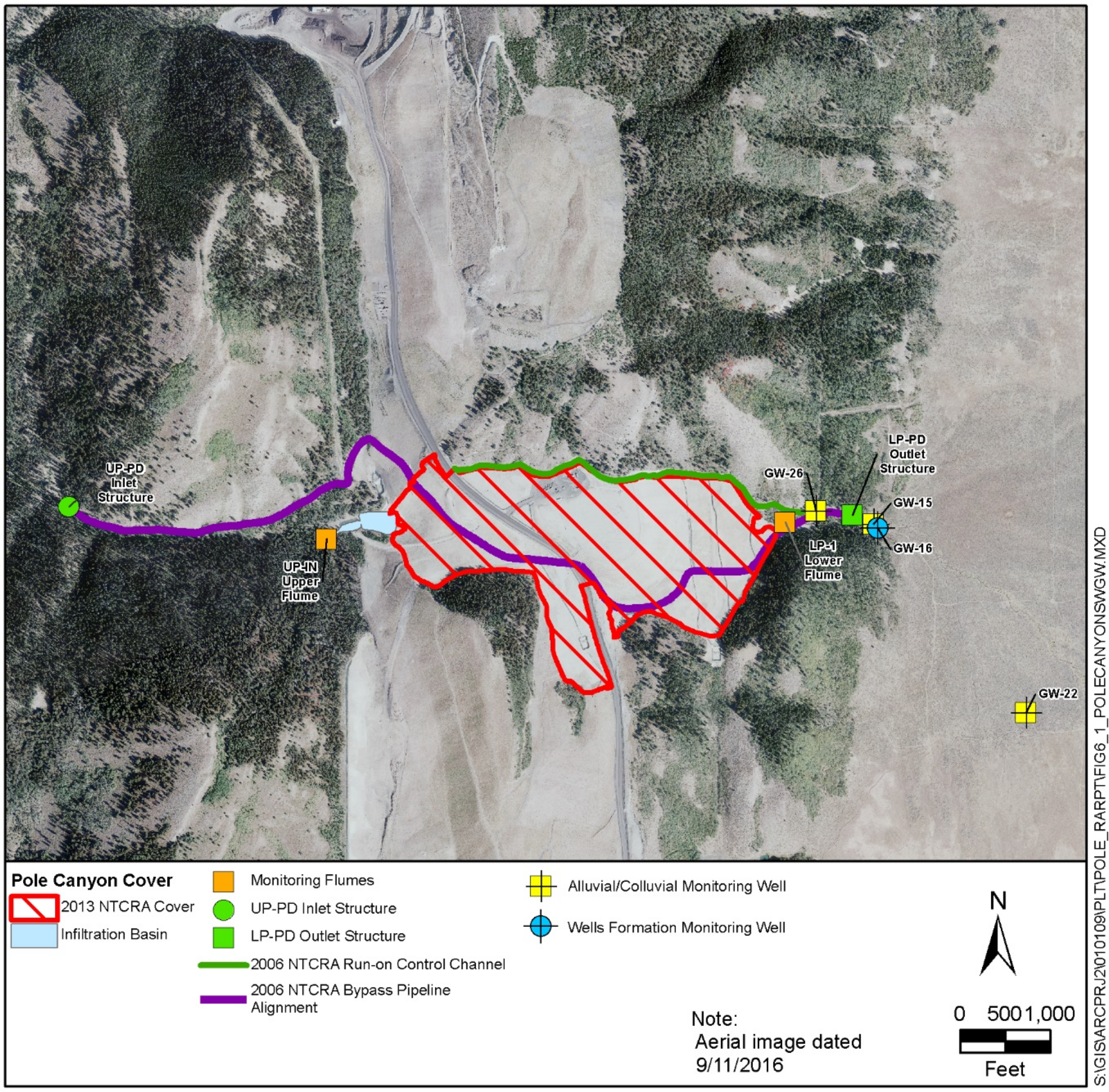

Figure 4-1: Pole Canyon Surface Water and Groundwater Monitoring Locations

4.1.2 Analytical Data Quality

All surface water, groundwater, and vegetation samples were collected in accordance with Standard Operating Procedures (SOPs) provided in the QAPP for Environmental Monitoring Activities (referred to as the Site-Wide QAPP) (Formation 2015b), which is included as Appendix B of the Comprehensive Environmental Monitoring Program Plan (CEMPP) (Formation 2015a). QC samples were collected as specified in the Site-Wide QAPP.

Surface water, groundwater, and vegetation samples were analyzed in the laboratory using methods specified in Table 2-7, Table 2-8, and Table 2-10, respectively, of the Site-Wide QAPP or updated methods as required under USEPA's SW-846 Test Methods Compendium (USEPA 2015). Concentrations of metals below the laboratory method detection limit (MDL) were assigned "U" qualifiers and are considered non-detect (ND). Results between the MDL and the practical quantitation limit (PQL) were assigned "J" qualifiers to indicate the uncertainty associated with concentration values reported below the quantitation limit (i.e., the laboratory PQL).

Field and laboratory records for the effectiveness monitoring program were reviewed to evaluate data quality in accordance with requirements of the Site-Wide QAPP (Formation 2015b). Laboratory data generated as part of the effectiveness monitoring activities were validated and reviewed in accordance with validation protocols provided in JRS SOP No. 20 (Inorganic Data Evaluation). No analytical results from the 2017 and 2018 monitoring activities were rejected during the data validation/review process. Effectiveness monitoring data met the requirements for precision, accuracy, representativeness, completeness, and comparability. The surface water, groundwater, and vegetation monitoring data are considered usable, or usable with qualification, to address the DQOs specified in EMP Revision No. 5 (Formation 2018a).

4.1.3 Performance Standards for Cover

Section 2.2.2 (Item 11) of the SOW specifies the design information required in the Draft Pre-Final RDR for the cover and for other components of the RA. The performance standards for the cover are achievement of a Ks of 1×10^{-4} cm/sec or less, as documented in the Final Pole Canyon ODA Early Action Engineering Evaluation/Cost Analysis (EE/CA) (Formation 2012b). Simplot provided a letter to the Forest Service documenting the results of the vertical hydraulic conductivity testing program (Simplot 2016). The testing results indicate a geometric mean Ks that is less than 1×10^{-4} cm/sec, which meets the performance standards specified in the SOW. A copy of the letter is included in Appendix F.

4.2 Construction Quality Control

The CQC and CQA for the 2013 NTCRA is discussed in the following subsections. Related CQC and CQA documents are presented in Appendix G. The CQC was an ongoing process of controlling and measuring material and earthwork characteristics to provide verification that the work was performed in accordance with the approved plans, specifications, and field changes. The CQC was performed by qualified members of Kilroy's construction team as recorded in daily logs. The CQA was performed by Formation's on-site CQA Manager Jon Friedman, P.E., whose contact information is provided in Section 9.0 of this report. Geotechnical data collected or measured for CQC purposes including density, grain size (sieve) analysis, grout/concrete compressive strength, laboratory permeability, Atterberg limits, Los Angeles abrasion tests, and field permeability (borehole permeameter) test results are provided in Appendix H.

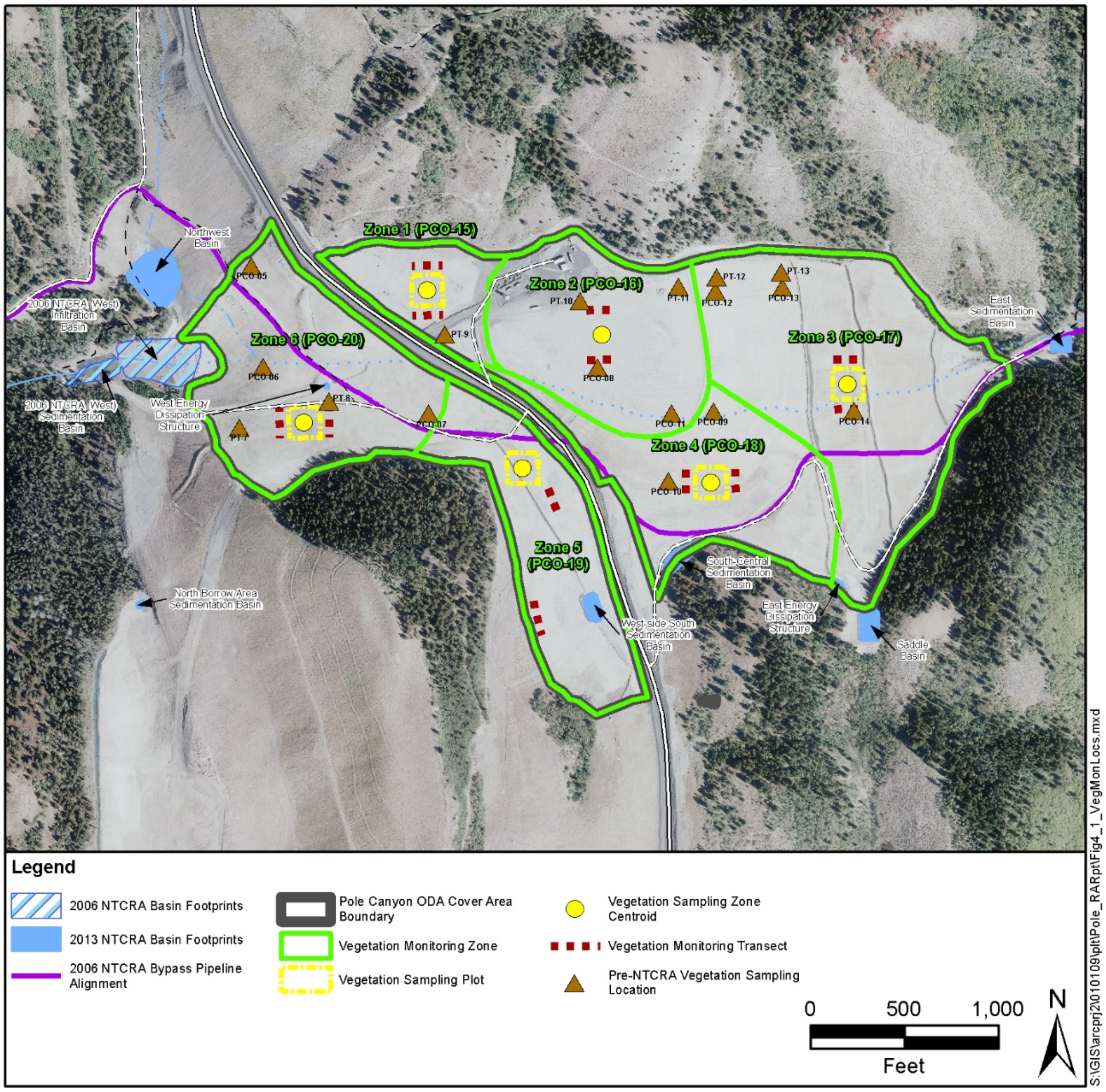

Figure 4-2: Vegetation Effectiveness Monitoring Locations (July 2018)

4.2.1 Earthwork

Compaction testing of structural fill areas such as sedimentation basin embankments was performed using a nuclear densometer in accordance with American Society for Testing and Materials (ASTM) D6938 to assess in-place compacted density and moisture content of fill materials. The in-place density test results were compared with maximum dry densities and optimum moisture contents as measured in accordance with ASTM D698 (Standard Proctor Compaction Curve). In general, compacted earthen structures such as sedimentation basin embankments were required to exhibit densities equal to or exceeding 95% of the maximum dry density per ASTM D698. Compaction for establishment of healthy vegetation was achieved by normal travel of placement and grading equipment and was not subject to rigorous compaction criteria. Compaction of Dinwoody material used to line channels and basins that overlie ODA materials was required to equal or exceed 90% of the maximum dry density per ASTM D698.

The frequency of compaction testing for compacted fill in the sedimentation basin embankments for the purposes of CQC was one test per 5,000 CY, or one test per lift, whichever was more frequent. Compaction testing of fill around culverts was required once per 40 linear feet of culvert. Any area of fill that failed to meet the compaction acceptance criteria was reworked until a subsequent test showed acceptable results. Approximately 122,000 CY of compacted fill material were placed as part of the 2013 NTCRA. A total of 95 compaction tests were performed, which exceeded the required minimum of 25 compaction tests.

Compaction testing for CQC purposes was implemented by Kilroy's geotechnical subcontractor, Xcell Engineering of Pocatello, Idaho. Compaction testing for CQA purposes was implemented by Formation's geotechnical subcontractor, Strata of Pocatello, Idaho, under the supervision of Formation's CQA Manager. Geotechnical data are provided in the tables in Appendix H.

4.2.2 Surveying

CQC of geometric limits (e.g., grade and contour) for the cover was implemented through the use of wooden grade stakes and GPS-guided equipment. The placement of stakes was performed by Jorgensen Associates, PC (Jorgensen), of Jackson, Wyoming, using standard surveying techniques. Surveys were implemented, as needed, during construction to verify that design lines and grades were achieved within acceptable tolerances.

Survey control was established prior to construction using the existing Smoky Canyon Mine coordinate system and topography. Day-to-day surveying during construction to verify that the NTCRA was constructed according to the approved design was performed by Kilroy and Jorgensen. Survey work was performed by Jorgensen, as construction was completed, to document as-constructed conditions. The final as-built survey was performed by Pierson Land Works, LLC in October 2016.

4.2.3 Construction Inspection and Management

Construction inspections included observations of construction at the ODA and Dinwoody borrow area. Minor questions from the contractors were addressed by Formation's on-site CQA Manager (Jon Friedman, P.E.) in coordination with Formation's Project Engineer (Brian Hansen, P.E.). Design changes identified by the Project Engineer during construction were documented and submitted to the Forest Service for review through the ECO process (Section 2.2).

The CQA Manager coordinated all third-party site surveying needs and CQA testing to identify the appropriate timing and locations of CQA testing in light of the required frequency, the locations of recently constructed areas, and CQC compaction tests. Strata periodically performed CQA tests for field compaction and Simplot periodically excavated potholes to verify cover thicknesses. The CQA tests for embankment-fill compaction were performed at a rate of approximately 10% of the CQC tests. CQA compaction tests were sufficiently distributed, both horizontally and vertically, to be representative of density conditions throughout a given fill area and to thus verify the findings of CQC compaction testing.

4.2.4 Verification Sampling and Testing of Materials

Kilroy obtained submittals for materials (e.g., silt fence, seed, fertilizer, TRM, etc.) used to construct the NTCRA. Submittals were reviewed by the Project Engineer for compliance with specifications. Approved material submittals are included in Appendix G.

4.2.5 Construction Oversight

The Forest Service OSC (Mary Kauffman) provided oversight of Simplot's RD/RA activities including reviewing deliverables and conducting field inspections from January 2013 through December 2015. Starting in January 2016, Sherri Stumbo provided oversight as the Forest Service OSC. Art Burbank, P.E. assumed the responsibilities as the OSC starting in April 2016 and is currently the Remedial Project Manager (RPM) for the Pole Canyon ODA NTCRA project.

5.0 REMOVAL ACTION GOALS

In accordance with the project completion and close out activities identified in Section IX of the ASAOC (USFS, IDEQ, and Tribes 2013), Simplot conducted the necessary construction inspections, which are detailed in Section 6.0 of this RA Report, to verify that construction of the removal action was complete. Performance and effectiveness monitoring have been performed since fall 2016 to document that the removal action is operational and functional.

The removal action goals for this project, as stated in Section V of the ASAOC and based on the NCP factors discussed in Section III of the Forest Service Action Memorandum, are as follows:

1. Reduce or eliminate the amount of water that infiltrates into the ODA due to direct precipitation.

2. Reduce or eliminate the potential for ecological risk due to ingestion of vegetation on the ODA.

3. Reduce or eliminate the potential for risk to human receptors due to ingestion of vegetation, and ingestion of and direct contact with ODA materials.

4. Eliminate the release of COCs from the ODA through sediment transport.

Sections 5.1 through 5.4 provide an explanation of how each of the removal action goals has been met through implementation of the 2013 NTCRA at the Pole Canyon ODA.

5.1 Reduce Infiltration of Precipitation

The first removal action goal for the project is to reduce or eliminate the amount of water that infiltrates into the ODA due to direct precipitation. A water-balance and mass-balance comparison is performed for the Pole Canyon ODA NTCRA on an annual basis and results are presented in the Annual PEMR. The annual water-balance is based on modeled water inflows to and modeled and measured outflows from the Pole Canyon ODA. The water balance inflow estimates presented in the Draft 2018 Annual Pole Canyon NTCRAs PEMR (Formation 2019) are reproduced below in Table 5-1. The table provides estimated water balance inflow results for both the "without NTCRAs" and "with NTCRAs" scenarios. The "without NTCRAs" scenario shows the prediction of water inflow if neither the 2006 nor the 2013 NTCRA were implemented. The "with NTCRAs" shows the estimated water inflows for actual conditions. As shown, the direct infiltration of precipitation into the ODA has been reduced by construction of the Dinwoody/chert cover system. Furthermore, the storm water collection system has significantly reduced the amount of run-on onto the ODA, and subsequent infiltration of storm water run-on through the ODA.

Table 5-1: 2018 Pole Canyon ODA Water Balance Model Inflow Summary

Inflow	Without NTCRAs (acre-feet)	With NTCRAs (acre-feet)	Estimated Reduction (%)
Upper Pole Canyon Creek flow	480	0	100
Direct infiltration into ODA from surface	51	25	51
Run-on from upslope area due north of ODA	53	0	100
Run-on from Panel A storm water collection ditch	46	0	100
Total	**630**	**25**	**96**

The reduction in infiltration through the ODA due to completion of the cover system and run-on controls is further evidenced by the selenium concentration at the Pole Canyon ODA toe seep (LP-1), as shown on the time-series plot provided as Figure 5-1. Following completion of cover system construction in 2015, there was an immediate decrease in selenium concentration detected at LP-1 due to reduced infiltration into the ODA and subsequent mobilization of selenium. Selenium concentrations appear to be continuing to decrease. Therefore, both the modeling and monitoring data support that the removal action goal to reduce or eliminate the amount of water that infiltrates into the ODA due to direct precipitation has been met.

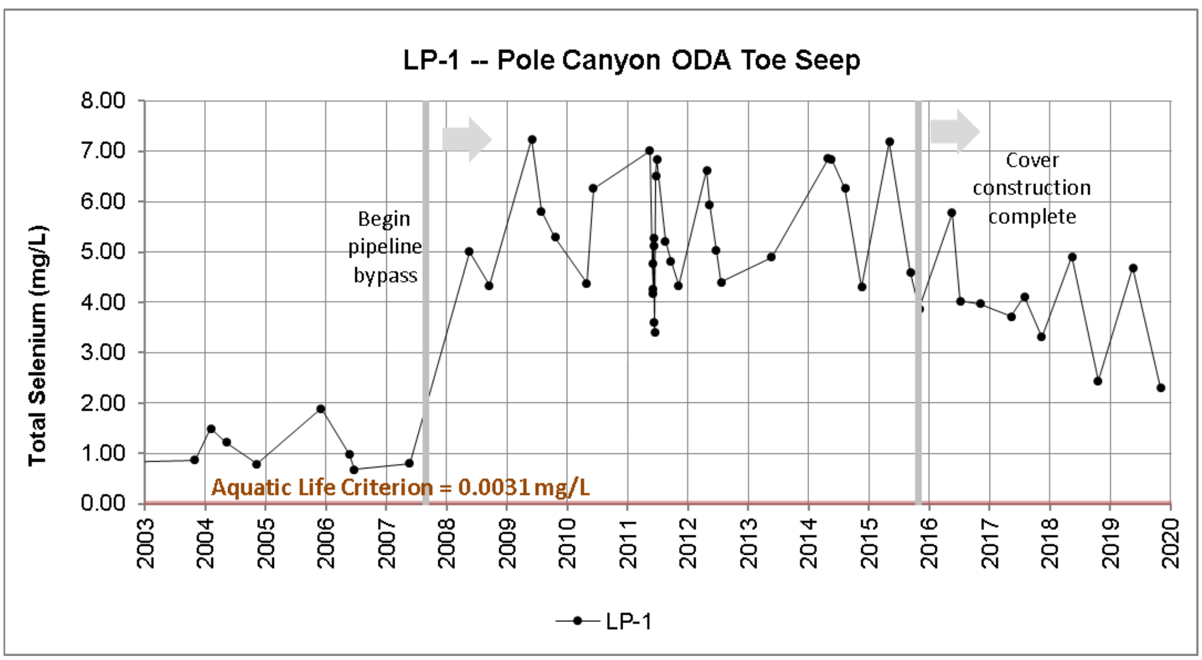

Figure 5-1: Selenium concentrations at LP-1

5.2 Reduce Human and Ecological Risks Due to Ingestion of Vegetation

The second and third removal action goals for the 2013 NTCRA are to reduce or eliminate the potential for human and ecological risk due to ingestion of vegetation on the ODA. A five-foot thick cover system was constructed on the ODA that consists of a two-foot chert layer overlain by a three-foot layer of Dinwoody material. The first one-foot lift of Dinwoody material was compacted to increase the density and decrease the vertical hydraulic conductivity of the material. The upper two feet of Dinwoody material were placed in a single lift and compacted only by equipment travel during placement to allow plant roots to penetrate the soil. The cover was revegetated with native low-selenium-accumulating grass species to reduce uptake of selenium by plants growing on the cover system.

Construction of the Dinwoody/chert cover system has reduced selenium uptake by plants thereby reducing or eliminating the potential for risks to grazing animals due to ingestion of vegetation and the potential for risks to human receptors from ingestion of vegetation. The reduction in selenium uptake has been demonstrated by vegetation monitoring in 2018 which showed reductions in post-NTCRA selenium concentrations in vegetation growing on the cover system relative to pre-NTCRA conditions, as presented in the 2018 PEMR (Formation 2019). Selenium concentrations in pre-NTCRA forage vegetation ranged from 1.1 to 145 milligrams per kilogram (mg/kg), with an average of 18 mg/kg. Selenium concentrations in post-NTCRA forage vegetation ranged from non-detect to 0.246 mg/kg, with an average of 0.085 mg/kg. The post-NTCRA average concentration has decreased relative to the pre-NTCRA average concentration, as shown by the boxplots in Figure 5-2.

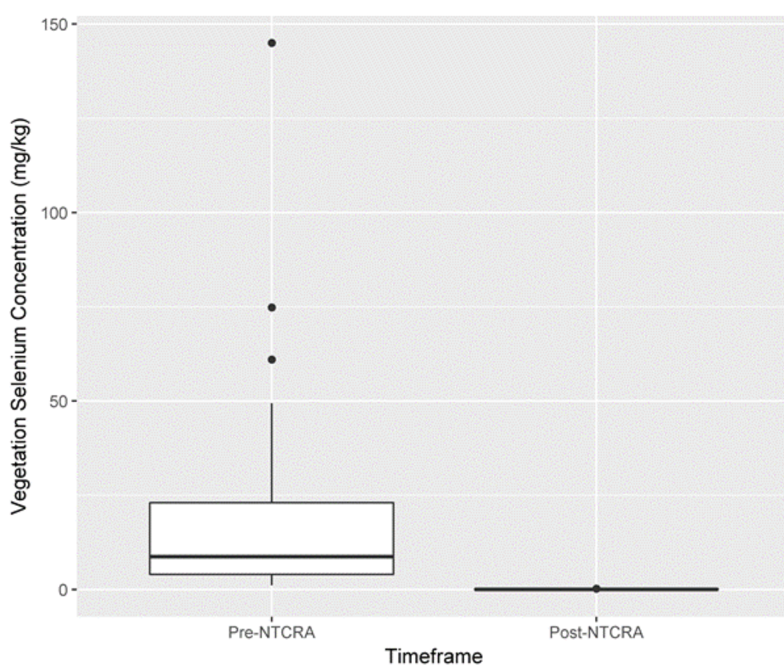

Figure 5-2: Pre- and Post-NTCRA Vegetation Selenium Concentrations

In addition to the boxplot comparison, a non-parametric test was used to confirm that post-NTCRA selenium concentrations in vegetation are statistically lower than pre-NTCRA concentrations (Formation 2019). This statistical test confirms that the selenium concentrations are lower and, thus, that the Dinwoody/chert cover NTCRA is effective in reducing the uptake of selenium by vegetation growing on the cover. Therefore, the removal action goal to reduce or eliminate the potential for human and ecological risk due to ingestion of vegetation has been met.

5.3 Reduce Ingestion of and Direct Contact with ODA Material

The third removal action goal for the project also includes the reduction or elimination of the potential for risk to human receptors due to ingestion of and direct contact with ODA materials. A five-foot thick Dinwoody/chert cover system was constructed on the ODA that consists of a two-foot chert layer overlain by a three-foot layer of Dinwoody material.

Construction of the Dinwoody/chert cover system has reduced or eliminated the potential for risks to human health because the multi-layer cover prevents direct contact with or ingestion of ODA material. This has been demonstrated by CQC procedures that document that the cover was constructed as designed. Test holes were excavated on a grid during cover placement to verify the required thicknesses of the chert (2 feet) and Dinwoody material (3 feet). The multi-layer cover prevents direct contact with or ingestion of ODA material. Therefore, the removal action goal to reduce or eliminate the potential for risk to human receptors due to ingestion of and direct contact with ODA materials has been met.

5.4 Eliminate Releases of COCs Through Sediment Transport

The fourth removal action goal for the 2013 NTCRA is to eliminate the release of COCs from the ODA through sediment transport. Construction of the 2013 NTCRA included covering the overburden material with five feet of Dinwoody/chert and revegetating the cover to control erosion.

The 2013 NTCRA components were designed to collectively eliminate the release of COCs from the ODA in soil and sediment. Test holes were excavated on a grid during cover placement to verify the required thicknesses of the chert and Dinwoody material. As described in Section 4.3, CQC of geometric limits (e.g., grade and contour) for the cover and day-to-day surveying during construction was performed to verify that the NTCRA was constructed according to the approved design. Semiannual inspections have demonstrated that the cover system has eliminated the potential for erosion of contaminated surficial material off the ODA, release into surface water of Pole Canyon Creek, and subsequent deposition downstream as sediment. The continued performance of the 2013 NTCRA in eliminating the release of COCs from the ODA via sediment transport will continue to be demonstrated through ongoing annual inspections and maintenance of the cover in accordance with the PRSC Plan (Formation 2016b). Therefore, the removal action goal to eliminate the release of COCs from the ODA through sediment transport has been met.

6.0 FINAL INSPECTIONS AND CERTIFICATION

In accordance with the November 27, 2013 ASAOC (USFS, IDEQ, and Tribes 2013) and the Removal Action Work Plan (RAWP) (Formation 2014b), multiple inspections were conducted throughout the construction process. These inspections consisted of site visits by Forest Service and/or support agency personnel to assess the status of NTCRA construction. All construction deficiencies identified by the Forest Service and/or support agencies were addressed by Simplot. The dates and personnel conducting the inspections during implementation of the 2013 NTCRA are summarized in Table 6-1. These inspections as well as actions taken to address identified construction deficiencies were summarized in weekly and monthly progress reports. Reports were also prepared and submitted for the Pre-Final Inspection (Simplot 2015) and the Final Inspection (Formation 2017a).

Table 6-1: Construction Inspection Dates and Personnel

Inspection Date	Inspection Personnel
2015-04-01	Mary Kauffman, USFS; Grant Williams, Simplot; Jon Friedman, P.E., Formation
2015-04-20	Mary Kauffman, USFS; Grant Williams, Simplot; Jon Friedman, P.E., Formation
2015-05-05	Mary Kauffman and Sherri Stumbo, USFS; Monty Johnson and Grant Williams, Simplot; Jon Friedman, P.E., Formation
2015-06-17	Mary Kauffman, USFS; Grant Williams, Simplot; Jon Friedman, P.E., Formation
2015-07-27	Mary Kauffman, USFS; Jeremy Moore, U.S. Fish and Wildlife Service (USFWS); Grant Williams, Simplot; Jon Friedman, P.E., Formation
2015-09-24	Mary Kauffman and Sherri Stumbo, USFS; Doug Tanner and Tom Hepworth, IDEQ; Sandi Arena, USFWS; Matt Wilkening and Mark Stifelman, USEPA; Monty Johnson and Grant Williams, Simplot; Jon Friedman, P.E., Formation
2015-10-27	Pre-Final Inspection. Mary Kauffman, USFS; Monty Johnson and Grant Williams, Simplot; Jon Friedman, P.E., Formation
2016-08-09	Final Inspection. Art Burbank and Sherri Stumbo, USFS; Grant Williams and Rachel Roskelley, Simplot; Jon Friedman, P.E., and Brian Hansen, P.E., Formation

6.1 Inspections

6.1.1 Pre-Final Inspection

In accordance with the RAWP, Addendum 1 (Formation 2015a), Simplot provided notification to the Forest Service that construction was substantially complete in order to initiate the Pre-Final Inspection. The Pre-Final Inspection was conducted by Forest Service, Simplot, and Formation personnel on October 27, 2015. During the Pre-Final Inspection, the facilities constructed under the NTRCA were inspected to determine compliance with approved Final Designs, ECOs, the RAWP, and RAWP Addendum 1. A list of outstanding construction activities needed to complete the 2013 NTRCA, including estimated completion percentages at the time of the Pre-Final Inspection and estimated completion dates was prepared to facilitate the Pre-Final Inspection (Table 6-2). Outstanding construction issues identified during the inspection were noted.

Table 6-2: Pre-Final Inspection Completion Items Punch List and Estimated Completion Date

Description	Percent Complete (2015-10-27)	Needed to Complete	Actual/Estimated Completion Date
Installation of 42-inch Culvert Intake Structure	100	Complete	2015-09-25
Panel A Runoff Ditch East of Haul Road	50	Finish excavation, riprap and grout down drop to inlet structure	2015-11-14
ODA cover (chert and Dinwoody) over 6 acre area west of new blast compound [Table Text]	0	Haul and place 2 ft of chert and 3 ft of Dinwoody	2015-11-14
East Runoff Ditch east side of Haul Road	0	Excavate and line with TRM	2015-11-14
Final Grading Top East Side ODA	0	Regrade top east side ODA to drain to down chute on south	2015-11-14
Top Runoff Control Berm East Side ODA	0	Haul and place Dinwoody material to construct berm	2015-11-14
Down drain from east top area to South-Central Sedimentation Basin	40	Complete excavation, tie into upper and lower sections, line with riprap	2015-11-07
South-Central Runoff Ditch	100	Complete	2015-09-04
South-Central Chute to EDS	100	Complete	2015-10-10
East Side EDS	95	Small quantity of grouted rip rap remains	2015-11-07
South-Central Ditch from EDS to Saddle Basin	95	Ditch lining remains	2015-11-07
Saddle Basin including embankments and spillway	95	Final grading, access road wearing coarse, hydro seed	2015-11-07
Lower West Side Runoff Ditch Outfall to West Sedimentation Basin	0	Excavation and lining	2015-11-21
West Sedimentation Basin	0	Excavation and final grading	2015-11-21
Lower West-Side ODA chert and Dinwoody cover above infiltration basin	0	ODA cover placement	2015-11-21
Grade West-Side ODA cover above infiltration basin to promote drainage to west toe	0	Final grading	2015-11-14
Rock Buttress on West Side ODA Face Slopes 2(h):1(v) or steeper	5	Geofabric placement, rock placement	2015-11-21
South West-Side ODA cover (7-acre area of former blast compound; WS-R2-BC)	60	Chert and Dinwoody placement	2015-11-14
South West-Side Runoff Ditch	0	Fill placement and ditch excavation	2015-11-14

Description	Percent Complete (2015-10-27)	Needed to Complete	Actual/Estimated Completion Date
South West-Side Sedimentation Basin	60	Fill placement, compaction and final grading	2015-11-14
South West Side Sedimentation Basin Discharge Ditch to South Culvert	0	Fill placement, ditch excavation	2015-11-14
West side Runoff Ditch Inlet to 48-inch Culvert	100	Complete	2015-10-10
42-inch Culvert Outlet for distance of ~100 ft	100	Complete	2015-10-10
Inlet to Northwest Sedimentation Basin	0	Excavate, place and grout riprap	2015-11-14
Northwest Sedimentation Basin Outfall at Drop between Cells	0	Excavate, place and grout riprap	2015-11-14
Northwest Sedimentation Basin Outfall to Infiltration Basin	0	Excavate, place and grout riprap	2015-11-14
West Sedimentation Outfall	0	Excavate, place and grout riprap	2015-11-21
West Side Energy Dissipation Structure	100	Complete	2015-10-10
East Side Top Down Chute to East Side Runoff Control Ditch	50	Tie-in at intake and outlet, place and grout riprap	2015-11-07
East Side Runoff Control Ditch at Outfall	75	Tie-in at intake and outlet, place and grout riprap	2015-11-07
East Side Runoff Control Ditch Chute to South Central Sedimentation Basin	90	Tie-in at intake and outlet, place and grout riprap	2015-11-07
East Side Runoff Control Ditch Chute Outfall downstream of Cutoff Wall	90	Tie-in at intake and outlet, place and grout riprap	2015-11-07
Inlet to South (36-inch diameter) Culvert	60	Install flared CMP structure, construct down drop, place and grout riprap	2015-11-14
Hydro seed West Side ODA	90	Recently disturbed areas or areas previous not accessible remain	2015-11-21
Hydro seed East Side ODA	90	Recently disturbed areas or areas previous not accessible remain	2015-11-07
Install Erosion Control Wattles West Face ODA	0	Troughs need to be excavated, placement and staking remain	2015-11-28
Install Erosion Control Wattles East Face ODA	80	Troughs excavated, placement and staking remain	2015-11-07
Northwest Detention/Sedimentation Basin	0	Excavate, shape, final grading	2015-11-28

Description	Percent Complete (2015-10-27)	Needed to Complete	Actual/Estimated Completion Date
Northwest Detention/ Sedimentation Basin Outlet and Spillway and Outfall to Infiltration Basin	0	Excavate, place and grout riprap	2015-11-28
Upper East Face Runoff Ditch	90	Tie-into south runoff control ditch, complete TRM lining	2015-11-07
Middle East Face Runoff Ditch	80	Tie-into south runoff control ditch, complete TRM lining	2015-11-07
Lower East Face Runoff Ditch	75	Tie-into south runoff control ditch, complete TRM lining	2015-11-07
East Side ODA South Access Road	90	Final fill placement, final grading and wearing coarse placement	2015-11-07
Southeast Runoff Ditch	75	Complete excavation, line with riprap/TRM	2015-11-07
Southeast Runoff Ditch Access Road	90	Final fill placement, final grading and wearing coarse placement	2015-11-07
East Sedimentation Basin	100	Complete	2015-07-10
East Sedimentation Basin Spillway and Ditch to Existing Drainage	100	Complete	2015-09-25
Dinwoody Borrow Topsoil Stockpile	100	Stockpile used for project wide reclamation as necessary	2015-07-17
Dinwoody Borrow Timber Slash	100	Complete	2015-04-10
Dinwoody Borrow South Run-on Control Ditch	100	Complete	2015-10-10
Dinwoody Borrow North Run-on Control Ditch	80	TRM lining remains	2015-11-21
Dinwoody Borrow South Sedimentation Basin	100	Complete	2015-04-24
Dinwoody Borrow North Sedimentation Basin	100	Complete	2015-08-07
Dinwoody Borrow Hydro seed	80	Recently disturbed areas or areas previously not accessible remain	2015-11-28
Precast Concrete Cutoff Walls	60	Installation of cutoff wall remains for several conveyance structures	2015-11-28

Notes:
N/A = Not available.

Following the inspection, a Pre-Final Inspection Technical Memorandum (Simplot 2015) was prepared, pursuant to the ASAOC (USFS, IDEQ, and Tribes 2013), which detailed outstanding construction issues, a plan to address the issues, and estimated completion dates for each item.

Outstanding items identified in the Pre-Final Inspection were substantially completed before the end of the 2015 construction season and submittal of the Technical Memorandum. As shown in Table 6-3, only two punch list items were not completed at the conclusion of the 2015 construction season. Since completion of the most of the outstanding items identified in the Pre-Final Inspection occurred after significant snowfall at the Mine, which prevented adequate access and viewing of various components of the NTCRA, the Forest Service OSC recommended that the Final Inspection be delayed until late spring 2016 following snowmelt (USFS 2016a).

Table 6-3: Pre-Final Inspection Punch List Items Remaining at Conclusion of 2015 Construction Season

Description	Percent Complete (2015-12-11)	Needed to Complete (as of 2015-12-11)	Estimated Completion Date
Final Grading Top East Side ODA	95	Regrade top east side ODA to drain to down chute on south. Several small low areas remain.	Summer 2016
Rock Buttress on West Side ODA Face Slopes 2(h):1(v) or steeper	5	Geofabric placement, rock placement	Summer 2016

6.1.2 Final Inspection

In accordance with the RAWP, Addendum 1 (Formation 2015a), a Final Inspection is to occur after any work noted in the Pre-Final Inspection is completed. The schedule in Attachment 1 of the SOW specifies that the Final Inspection is to occur within 30 days after completion of outstanding items identified during the Pre-Final Inspection. Due to the heavy snowfall within the Pole Canyon ODA NTCRA project area in December 2015, the Forest Service OSC approved an extension for the Final Inspection, and the inspection was rescheduled for 2016. The Final Inspection of the 2013 NTCRA was conducted by Forest Service, Simplot, and Formation personnel on August 9, 2016 and the Pre-Final Inspection report and punch list items were used as a checklist to focus the inspection. This section describes the results for the Final Inspection, fulfilling the requirements of Section 2.7.7 of the SOW.

The 2013 NTCRA construction was considered complete following completion of the Pre-Final Inspection punch list items because the following required elements of the ASAOC SOW were constructed and in place to meet the NTCRA objectives:

- Placement of a layer of chert/limestone that is a minimum of two feet in thickness.
- Placement of a minimum of three feet of cover soil derived from the Dinwoody Formation (Dinwoody material) over the chert/limestone layer.
- Installation of storm water run-on/runoff controls to convey water off and around the ODA.

- Revegetation of the Dinwoody surface using native non-selenium-accumulator species to control erosion.

- Implementation of a quality assurance and monitoring plan to confirm that the saturated hydraulic conductivity of the completed cover system is equal to or lower than $1x10^{-4}$ cm/sec as prescribed in the Final RDR (Formation 2014c).

Simplot provided a letter to the Forest Service documenting the results of the vertical hydraulic conductivity testing program (Simplot 2016). The testing results indicate a geometric mean Ks that is less than $1x10^{-4}$ cm/sec. A copy of the letter is included in Appendix F.

The Construction Inspection Report (Formation 2017a), was prepared and submitted to the Forest Service following the Final Inspection. The Construction Inspection Report documented that outstanding construction issues identified during the Pre-Final Inspection were adequately addressed, provided a record of activities conducted during construction, documented key field decisions, and described the rationale for considering the work complete. The report also provided construction CQA/CQC records, a summary of site inspections by the Forest Service and/or support agencies as construction progressed, drawings generated to specify construction activities, an as-built survey map, project photographic log, and documentation of ECOs. The Forest Service OSC identified punch-list items requiring further attention during the August 9, 2019 Final Construction Inspection (USFS 2016b), as summarized in Table 6-4. As documented in Forest Service correspondence, it was agreed in the field that these were OM&M items and not Final Construction Inspection items.

Table 6-4: Final Inspection Maintenance Items

Description	Remedy	Date Completed
Main ODA near top of East Chute disturbed and muddy	Regrade and reseed when moisture levels are favorable	August 2016
Displaced TRM along Saddle Basin	Pull up and re-secure TRM	August 2017
Areas of sparse vegetation in Dinwoody borrow area	Reinvestigate area in spring 2017 to see if vegetation becomes established, reseed if necessary	June 2017
Areas of sparse vegetation at top of main ODA	Wait and see if vegetation becomes established, reseed as needed during favorable conditions	June 2018

Notes:
TRM = Turf Reinforcement Mat

Because these items were considered OM&M under the PRSC Plan (Formation 2016b), they were addressed during annual maintenance activities. The main ODA area near the top of the East Chute was regraded shortly after the Final Inspection in August 2016. This area required additional regrading to promote positive drainage in the summer of 2017 and again in 2018. The displaced TRM along the saddle basin was pulled up and re-secured in August 2017. Areas of sparse vegetation in the Dinwoody borrow area were reinvestigated in June 2017. Areas of sparse vegetation at the top of the main ODA were observed to see if vegetation became more established over time. Additional seed and fertilizer were applied to areas of sparse vegetation at the top of the main ODA in the spring of 2018. Vegetation in the Dinwoody borrow area has become established and has not required re-seeding.

6.2 Health and Safety

The 2013 NTCRA construction and sampling activities were conducted under the Health and Safety Plan (HASP), which was part of the Quality Control Plan included in the Final RAWP (Formation 2014b) as required by Section 9.6.2 of the ASAOC. The purpose of the HASP was to outline plans and procedures that are intended to protect on-site personnel and visitors from potential hazards associated with the construction and sampling activities. The HASP included general facility information, personnel affiliated with the NTCRA, levels of protection, personal protective equipment, personal hygiene, safe work practices, medical surveillance, air monitoring, decontamination, site work zones, contaminant control, emergency planning information, and record keeping guidelines. Copies of the HASP were maintained in the project field office during the construction activities. All requirements of the HASP were adhered to while implementing construction and sampling activities. No substantial health and safety problems or deviations from the HASP occurred.

6.3 Certification

In accordance with Section IX, Subsection 9.6.4 of the ASAOC, the Final RA Report shall include the following certification signed by a person who supervised or directed the preparation of that report:

"Under penalty of law, I certify that to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of the report, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

This certification is provided in the front matter of this RA Report.

7.0 OPERATIONS, MAINTENANCE, AND MONITORING ACTIVITIES

The long-term performance and effectiveness of the 2013 NTRCA are evaluated through performance and effectiveness monitoring. Performance monitoring is conducted to evaluate the integrity of the Dinwoody/chert cover system and storm water controls as described in Section 7.1. Effectiveness monitoring is conducted to evaluate the effectiveness of the cover system in terms of achieving the objectives of the 2013 NTCRA as described in Section 7.2. Results of the performance and effectiveness monitoring are submitted to the Agencies in the Annual Pole Canyon ODA NTCRA PEMR. Maintenance activities are described in Section 7.3.

7.1 Performance Monitoring

Performance monitoring includes routine inspections of the 2013 NTCRA to verify that the components are performing as designed and to identify any maintenance or repair needed. The integrity of the Dinwoody/chert cover system; drainage runoff control system including channels, outfalls, culverts, and EDS; sedimentation, infiltration, and detention basins; access roads; and the Dinwoody borrow area are evaluated through routine and periodic inspections. The purpose of the inspections is to identify maintenance activities needed to maintain the integrity of the NTRCA. Each inspection requires the completion of an inspection form and a photographic log. The PRSC Plan specifies semiannual inspections, once in the spring following snowmelt (late May to early June) and once in the fall (late September to mid-October), for the first three years following construction completion to allow vegetation to become adequately established, and then annually thereafter. Semiannual inspections have been performed since fall 2016. The inspection frequency will be reduced to annually starting in spring 2020, and the annual inspections will continue through the duration of mining at the Smoky Canyon Mine.

The PRSC Plan also recommends inspections following any 100-year, 24-hour storm events (2.9 inches) as measured at the Smoky Canyon Mine guard building. Precipitation measurements are made by Simplot personnel using an on-site rain gauge. Seismic events greater than or equal to magnitude 6, as identified from the U.S. Geological Survey website (http://earthquake.usgs.gov) also require follow up inspections. In addition, inspections are to be performed following local forest fires in the project area, significant upgradient logging, or nearby land development that may impact the NTCRA components.

7.1.1 Soil Cover System

The soil cover system is inspected for signs of erosion (e.g., rilling) and to verify that the cover has not been significantly altered by trespassers, wildlife, and/or adverse weather. The east-side top area of the NTCRA and blast compound storage area have relatively shallow surface slopes (less than 1 percent to a few percent). These areas are inspected for settlement and potential areas of water pooling. Temporary erosion control features including fiber wattles and silt fencing have been installed on the NTCRA cover to reduce runoff velocity and the potential for rill development and to capture sediment as vegetation becomes established. Temporary erosion control features are inspected to verify they are intact and functioning properly. As the vegetation has become well established on the NTCRA slopes, fiber wattles are less important. It is anticipated that the wattles will become deteriorated over time and will not require repair or replacement following full vegetation establishment.

The vegetation on the cover system is inspected to verify adequate coverage and establishment to limit soil erosion. Vegetation growth is monitored for indications of nutrient deficiencies (e.g. stunted growth, yellowish-green leaves, etc.) and selenium-accumulating plant species and/or infestations of state-listed noxious weeds. If there are indications of nutrient deficiencies, the soil is tested for nitrogen, phosphorus, and potassium (NPK). Noxious weeds are sprayed, as needed in accordance with the existing Smoky Canyon Mine noxious weed program.

7.1.2 Drainage System

Run-on and runoff control structures including ditches, channels, chutes, berms, swales, culverts and associated EDSs and sedimentation basins, are inspected in accordance with the PRSC Plan (Formation 2016b) to verify that the protection is intact and that erosion, debris accumulation, and/or settlement has not compromised the function of the drainage structures. There are six round CMPs associated with the NTCRA cover including two under the mine haul road, two in the west-side runoff system, and two in the east-side runoff system. CMPs are inspected for accumulated sediment in the inlets/outfalls, the presence of large vegetation that could promote instability and/or impede discharge, and erosion around the pipe bedding. Metal and concrete inlet structures are inspected for stability, distortion, and cracking. The CMPs are also inspected for distortion, bending, joint separation, and collapse. EDSs are inspected to identify riprap displacement, erosion, riprap weathering, and damage to underlying geotextile.

7.1.3 Sedimentation, Infiltration, and Detention Basins

Sedimentation, infiltration, and detention basins are inspected for cracks, erosion, seepage, and/or sloughing that may indicate instability. Significant erosion, seepage, or sloughing along the basin embankments trigger in-depth inspections to verify embankment integrity. Dinwoody liners are inspected for cracking or other signs of loss of integrity. The approximate depth of sediment retained in the basin is estimated and water depth in each basin is recorded. Spillways are inspected to verify that there is no debris that would restrict flow and that they are maintained in a clear, free-flowing condition. The concrete cutoff wall of each spillway is inspected for cracks, erosion around the edges, and any undercutting. Spillway riprap outfalls are inspected for rock displacement, undercutting, and other potential problems. Low-level outlet pipe discharge systems are inspected for stability of the concrete risers and trash racks including potential clogging by debris at the inlets. The integrity of the outlet pipes and potential clogging with sediment are also evaluated. The outlet of each pipe discharge system is inspected for debris or rocks potentially impeding free discharge from the pipes.

7.1.4 Dinwoody Borrow Area

The Dinwoody borrow area is inspected for general condition, vegetative growth and erosion protection. Run-on ditches on the north and south sides of the borrow area are inspected to verify that the protection is intact and that erosion, debris accumulation, and/or settlement has not compromised the function of the drainage structures. Access roads are inspected to evaluate if erosion has removed road base and/or deposited sediment on the roads.

7.1.5 Roads and Fencing

Roads are inspected to evaluate if erosion has removed road base and/or deposited sediment on the roads. The embankments supporting access road are inspected for erosion and/or slope movements potentially resulting in road instability. Drainage ditches along the roads are inspected to verify they are functioning properly. Fencing is inspected to verify that it is intact, and the fence posts are wires are sound and in working order.

7.2 Effectiveness Monitoring

In addition to performance monitoring, effectiveness monitoring is required to determine if the objectives of the 2013 NTCRA are being met. Effectiveness monitoring locations are shown on Figure 4-1 and monitoring includes:

- Surface water monitoring at LP-1 (seepage from the downstream toe of the ODA), lower Pole Canyon Creek station LP-PD (downstream of the pipeline outlet), North Fork Sage Creek stations NSV-5 and NSV-6, and LSV-1 (below confluence of Sage Creek but above the confluence of Hoopes Spring), as well as two key locations upstream of the ODA – at UP-PD (upstream of the pipeline inlet) and UP-IN (upstream of the infiltration basin) to assess the combined effectiveness of the 2006 and 2013 NTCRAs in decreasing selenium transport from the Pole Canyon ODA to surface water.

- Groundwater monitoring locations in alluvium (GW-15, GW-22, and GW-26) and in the Wells Formation (GW-16) that are downgradient of the Pole Canyon ODA but upgradient of potential transport pathways from other source areas to assess the combined effectiveness of the 2006 and 2013 NTCRAs in decreasing selenium transport from the ODA to groundwater.

- Vegetation monitoring at six locations (Zones 1 through 6) on the Pole Canyon ODA Dinwoody/Chert cover system in 2018 to evaluate the effectiveness of the 2013 NTCRA in reducing or eliminating risks due to ingestion of vegetation growing on the cover after vegetation has become established.

EMP Revision No. 5 specifies semiannual monitoring, once in the spring following snowmelt (late May to early June) and once in the fall (late September to mid-October). Semiannual monitoring of the 2013 NTCRA has been performed since spring 2017 and will continue through the duration of mining at the Smoky Canyon Mine or will be changed in future revision to the monitoring plan.

EMP Revision No. 5 specifies vegetation monitoring once in 2018, approximately 3 years after the cover was seeded, to allow time for the vegetation to become established. If additional vegetation community monitoring and sample collection is needed, it will be conducted in July or August after the need for more data is identified.

The effectiveness evaluation consists of a statistical analysis of selenium concentrations and annual water-balance and mass-balance comparisons and uses a combination of monitoring data and computer modeling to quantitatively evaluate the overall effectiveness of both NTCRAs in reducing selenium transport from the Pole Canyon ODA to surface water and groundwater. One component of the modeling quantifies the potential reduction in direct infiltration resulting from the 2013 NTCRA Dinwoody/chert cover system. Comparison of pre- and post-NTCRA selenium concentrations in vegetation serve as the basis for evaluating the effectiveness of the cover system in decreasing selenium concentrations in vegetation on the Pole Canyon ODA.

The 2013 NTCRA has been designed to reduce the release of potentially contaminated material to off-site areas. The site features controlling releases are inspected and maintained annually. Additional sampling will be required in the event of a release. Such events would include any instance of a basin exceeding design capacity and overflowing into adjacent drainages, or any mass wasting resulting in the transport of solids outside the NTCRA area. Sampling for these events will be handled on a case-by-case basis.

7.3 Long-Term Maintenance

The need for, and nature of, maintenance and/or contingency activities is based on the findings of the previously described inspections and documented on the inspection forms and photographic logs. In general, maintenance activities for components of the NTCRA is performed in the summer or early fall when conditions are optimal.

7.3.1 Maintenance of Soil Cover System

Areas of the cover system that are found to be damaged are repaired, as needed, to maintain the functionality of the cover system. Minor areas of erosion are repaired by regrading so the erosion does not become more extensive. More significant areas of erosion and rills are restored with Dinwoody material from the Dinwoody borrow area or other Dinwoody sources at the Mine. Relatively level areas of the NTCRA on the east-side top are re-graded to promote positive drainage from the NTCRA if pooling is observed. Repaired areas of the NTCRA are reseeded with the approved seed mix, typically by hand, if over relatively small areas. Additionally, areas of where vegetation is not well established (i.e., able to appropriately limit soil erosion) are reseeded as necessary. Selenium-accumulator species and noxious weed plant species identified on the NTCRA cover are sprayed with the appropriate herbicide spot application in accordance with the existing noxious weed control program at the Mine. Additional fertilizer is applied to the cover as appropriate if vegetation shows indication of nutrient deficiencies (e.g., stunted growth, yellowish leaves, etc.).

7.3.2 Maintenance of Drainage System

Run-on and runoff control structures are maintained and repaired if inspections reveal signs of erosion, overtopping, large woody or rock debris, areas of sediment accumulation, and/or the presence of large vegetation that could promote instability and/or impede discharge. Areas of erosion and/or displacement/damage are repaired through the addition of new compacted material and seeding, as necessary. Woody debris and any large vegetation potentially restricting flow in the run-on and run of control structures is removed and placed downgradient of the Pole Canyon ODA.

Displaced riprap rock is repositioned, and additional riprap rock is added, as needed. Areas of erosion and undercutting along the edges of riprap is repaired by the addition of geotextile and compacted fill, as necessary. Weathered riprap that is no longer functioning as intended is replaced. Damaged geotextile is replaced with an appropriately sized patch and covered with additional riprap. Exposed geotextile at anchor trenches is repaired and re-anchored as necessary then covered with at least 6 inches of compacted granular soil. Grouted riprap sections that have significantly cracked or disintegrated are repaired by patching and/or re-grouting. Significant cracks in concrete headwalls at culvert inlets are repaired, as necessary, using either mortar or epoxy patch materials.

Damaged CMP inlet sections that inhibit inlet free flow conditions are repaired or replaced. Sediment is cleared from culverts if the flow capacity is significantly reduced. Sediment and debris clogging the inlets at trash racks or inlet sections is removed by hand or using small equipment. Sediment clogging the interior of a culvert is removed by water jetting or similar techniques.

7.3.3 Maintenance of Sedimentation, Infiltration, and Detention Basins

Sedimentation basin embankments that are observed to exhibit potential instability are repaired using compacted fill material. Woody vegetation is removed from sedimentation basins and embankments. Debris and sediment are removed from the overflow spillways and trash racks at pipe inlets to ensure the spillways and pipes can discharge freely. Erosion features along cutoff walls are filled with clean compacted fill material. Spalled or cracked concrete on cutoff walls or concrete supports for pipe risers are patched using structural epoxy or concrete mortar. Low-level pipes that are observed to be restricted by debris are cleared using high-pressure water jetting or similar methods. Accumulated sediment in the sedimentation basins that is within one foot of the top of the flow-through berm is removed to restore the original sedimentation capacity. Cracked Dinwoody liners are repaired if there is significant deterioration. Dinwoody liner repair consists of scarifying, moisture conditioning, and re-compaction to restore integrity.

7.3.4 Maintenance of Dinwoody Borrow Area

Erosion and rills on the Dinwoody borrow area are repaired by grading topsoil over the eroded area followed by re-seeding and installation of temporary erosion control (e.g., straw wattles). Sediment and/or woody debris within the flow lines of run-on ditches is removed. Displaced riprap at the outfalls is replaced. Accumulated sediment within one foot of the rock spillway crests of the borrow area sedimentation basins is removed. Areas of significant erosion along the sedimentation basin embankments are repaired by filling with clean compacted fill material. Displaced rock along spillways is replaced.

7.3.5 Maintenance of Roads and Fencing

Areas of erosion on access roads are filled with suitable compacted material and resurfaced with road base, as needed. Displaced erosion controls on fill slopes for roadway embankments are re-established and anchored, as needed. Debris present in roadside ditches is removed and minor earthwork performed, as necessary, to restore full drainage capacity. Areas along embankments supporting access roads indicating movement or possible embankment instability or failure, are inspected more frequently to determine if continued movement is occurring. If embankment movement is occurring, maintenance procedures are implemented as soon as possible to restore embankment stability. If failure zones are indicated along the crest of the embankments, such areas may require removal and re-compaction, as necessary, to restore structural integrity. Damaged site fencing is repaired, as necessary, using materials similar to the original fencing. The original, uninterrupted fence line is restored as necessary.

7.3.6 Potential Problems or Concerns with Maintenance and Monitoring Activities

Annual inspections of the NTCRA cover system components are conducted as part of the performance monitoring and require advance coordination with the Forest Service. Maintenance items noted during the inspections are generally repaired later in the same year. Potential problems are associated with snowpack obscuring the various cover and drainage system components. Simplot strives to schedule the inspections when the components are accessible and visible. Semiannual effectiveness monitoring is routinely performed during the spring and fall. Again, potential problems are associated with snowpack and muddy conditions that limit access to Pole Canyon. In addition, accumulation of sediment and/or debris in the flumes and weirs may affect flow measurements. Pressure transducers, which are used to record water levels in monitoring wells and at flumes and weirs may fail and record inaccurate data due to freezing conditions and/or clogged vent lines. Maintenance is generally performed during the late summer and fall when the weather is warmer, and haul road and cover conditions are drier. Potential problems associated with maintenance are related to inaccessibility due to muddy conditions at certain times of the year.

7.4 Annual Reporting

Results of the performance and effectiveness monitoring are combined for both the 2006 NTCRA and the 2013 NTCRA and are submitted to the Agencies by July 31 of each year in the Annual Pole Canyon NTCRA PEMR. The PEMR contains a summary of OM&M activities, inspections, notifications, and corrective actions required under the PRSC Plan and copies of inspection forms and photographs. As follow-up to the inspections, the annual report contains a description of the schedule and location of maintenance activities performed, and a description of any operational or maintenance problems encountered, and remedies applied. Photographs of areas needing maintenance and maintenance performed may be included. For effectiveness monitoring, the PEMR contains a description of all monitoring activities performed for the year. The report includes analytical results for all sampling and analyses performed and presents selenium loading and selenium concentration trends over time. An electronic data file is also provided.

If applicable, the PEMR discusses any deviations from the approved PRSC Plan or approved EMP and the impact on site conditions or data (if any). In addition, the report may include any requests and justification for modification of the PRSC Plan or EMP. If a significant event occurs (e.g., 100-year, 24-hour storm events, flooding, seismic events greater than or equal to magnitude 6, upgradient logging, and/or forest fires), a supplementary inspection will be performed, and a separate technical memorandum or report will be prepared. Modification to the OM&M activities will be implemented through consultation with Forest Service and support agency representatives.

8.0 COSTS

The final construction costs for the Dinwoody/chert cover system at the Pole Canyon ODA are provided below, along with an estimate of the costs anticipated for OM&M under the PRSC Plan.

8.1 RA Costs

Table 8-1 provides actual RA costs for construction of the 2013 NTCRA through the conclusion of the construction season in December 2015. As previously described, construction was considered complete in December 2015, and the few remaining items that needed to be addressed were considered OM&M items to be completed as part of PRSC.

Table 8-1: Removal Action Capital Costs

Description	Cost
Direct Capital Costs	
Mobilization and Site Preparation	$379,500
Regrading of ODA and Cover Placement	$4,537,900
Construction of Storm Water Controls	$2,304,100
Surfacing of Permanent Access Roads and Installation of Fences	$117,100
Revegetation, Reclamation, and Demobilization	$482,100
Total Direct Capital Costs	**$7,820,700**
Indirect Capital Costs	
Construction Implementation and Health and Safety Oversight	$386,100
Total Indirect Capital Costs	**$386,100**
2013 NTCRA Construction Total Costs	**$8,206,800**

8.2 PRSC Costs

This section provides a description of anticipated activities and an estimate of costs associated with PRSC for 30 years from the completion of the 2013 NTCRA. PRSC costs were estimated for activities associated with annual OM&M procedures as well as periodic costs associated with repairs of NTCRA components damaged due to extreme storm events and replacement of components that reach their end of life cycle. The unit and lump sum costs for maintenance and repair of the NTCRA are consistent with costs provided in the PRSC Plan (Formation 2016b). The net present value of PRSC activities was calculated assuming a 7 percent discount rate for a duration of 30 years. Anticipated PRSC costs and calculated present day values are summarized in Table 8-2.

As summarized in Table 8-2, annual OM&M costs are assumed to be approximately $600 per acre per year for the first five-years post construction and $300 per acre per year thereafter. While the costs associated with annual OM&M can be reasonably estimated, periodic costs associated with significant repair and restoration work are difficult to predict due to the uncertainty of weather events, seismic events, and system performance. For the purposes of this estimate, it is assumed that up to one-third of the NTCRA area (approximately 46 acres) may require significant repair or restoration work every 10 years. It is assumed that the cost for significant repairs of NTCRA components would be approximately triple the initial OM&M costs, or approximately $1,800 per acre once every 10 years for those areas requiring significant repair.

Although the NTCRA components are designed for a long-term/permanent life, some components have a limited useful design life. These components include CMPs and the low-level outlet pipe systems. CMPs have design lives of approximately 25 to 30 years before corrosion or other structural damage requires replacement. It is assumed that the CMPs will require replacement in 25 years. The replacement schedule of the low-level outlet pipe systems is approximately every 10 years.

Many of the sedimentation/infiltration basins are considered to be temporary and are only expected to be needed until vegetation becomes established. These include the sedimentation basins at the Dinwoody borrow area, the south-central sedimentation basin, saddle basin, the east sedimentation basin, and the west-side sedimentation basin. The Dinwoody borrow area sedimentation basins are assumed to only be needed until vegetation becomes well established in the borrow area. The other basins are expected to remain open and functioning through mine-closure when the remaining areas of the NTCRA (mine haul road and blast compound area) are completed, fully vegetated, and stabilized. Basin closure includes stabilizing remaining sediment with rock, backfilling basins with granular fill, and final grading a swale across the final top of the closed basin to divert discharge to the existing spillways.

Additionally, the current haul road crossing the Pole Canyon ODA and the blast compound will need to undergo reclamation following completion of mining activities at the Smoky Canyon Mine. Reclamation of the portion of the haul road that crosses the ODA will require construction of the same cover of 2 feet of chert overlain by 3 feet of Dinwoody material. It is assumed that this will be completed in approximately 20 years. Additionally, the top east-side of the NTCRA area currently used as a blast compound storage area will need to be reclaimed in approximately 20 years. The 2013 NTCRA cover is already installed in this area; however, the gravel road base will need to be removed and the area will need to be revegetated.

Table 8-2: Anticipated PRSC Costs

Description	Quantity	Unit	Unit Cost	Annual Cost
Annual OM&M Costs				
Inspection of NTCRA and Maintenance (Years 1-5)	139	AC	$600	$83,400
Inspection of NTCRA (Years 6-30)	139	AC	$300	$41,700
Performance Monitoring Reporting	1	EA	$69,500	$69,500

Present Value Lifecycle OM&M Costs				
Description	**Start Year**	**End Year**	**Annual Cost**	**Present Value**
Inspection of NTCRA and maintenance (Years 1-5)	1	5	$83,400	$342,000
Inspection of NTCRA (Years 6-30)	6	30	$41,700	$346,500
Performance Monitoring Reporting	1	30	$69,500	$862,400
			OM&M Present Value	**$1,550,900**

Description	Quantity	Unit	Unit Cost	Present Value
Periodic Costs				
Significant repair due to extreme weather events (Years 10, 20, and 30)	3	LS	$83,400	$74,900
Replacement of CMPs (Year 25)	1	LS	$110,000	$20,300
Replacement of low-level outlet pipe (Years 10, 20, and 30)	3	LS	$35,000	$31,400
Closure of Dinwoody Sedimentation Basin (Years 15 and 25)	2	LS	$15,000	$8,200
Closure of NTCRA Sedimentation Basins (Year 25)	1	LS	$120,000	$22,100
Reclamation of haul road over NTCRA (Year 20)	1	LS	$432,000	$116,600
Reclamation of blast compound area (Year 20)	1	LS	$45,000	$11,600
			Periodic Costs Present Value	**$280,200**
			OM&M and Periodic Costs Present Value	**$1,831,000**

Notes:
Present value = 7% discount for 30 years
AC = acres
EA = each
LS = lump sum

9.0 CONTACT INFORMATION

Key contacts for regulatory oversight, project managers, project engineers, oversight contractors, and general construction contractors include the following:

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